SPECTRUM®

ForeRunner ATM Switch Modules
Management Module Guide

CABLETRON SYSTEMS

The Complete Networking Solution™

Summary of Changes

Version	Date	Reason/Rational	Nature of Changes

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Contents

Preface

What Is in This Guide xi
Conventions xii
Terminology xii
Related SPECTRUM Documentation xiii
Other Related Documentation xiii

Chapter 1 Introduction

What Is in This Chapter 1-1
The Devices 1-1
ATM/ForeRunner Overview 1-2
SPECTRUM Model Types and Icons 1-4
- ForeRunner 1-4
- ForeSwitchApp 1-5
- ATM_Network 1-5
- ForeUserApp 1-6
- SW_Link 1-6
- Workstation 1-7

SPECTRUM Support 1-7
- Accessing SPECTRUM Views 1-7

SPECTRUM Views Roadmap 1-9

Chapter 2 Device Views

What Is in This Chapter 2-1
ForeRunner Interface Device View 2-2
- ForeRunner Interface Icons 2-3
- ForeRunner Interface Icon Labels 2-4
  - Interface Label 2-4
  - Administrative Status Label 2-4
  - Interface Type Label 2-4
  - MAC Address Label 2-4
  - Address Label 2-4
  - Gauge Label 2-5
- ForeRunner Interface Icon Subviews 2-5
  - Interface Detail View 2-5
  - Interface Status View 2-6
  - Fore Switch Interface Configuration View 2-7
  - Interface Address Translation Table View 2-7
  - Secondary Address View 2-8

Chapter 2 Device Views (continued)

Interface Threshold View 2-8
Performance View 2-8
ForeRunner Interface Options Panel 2-10
ForeRunner Gauge Control Panel 2-10
ForeSwitchApp Interface Device View 2-14
ForeSwitchApp Interface Icons 2-15
ForeSwitchApp Interface Icon Labels 2-16
Interface Label 2-16
Administrative Status Label 2-16
Interface Type Label 2-16
Inbound Gauge Label 2-16
Outbound Gauge Label 2-16
ForeSwitchApp Interface Icon Subviews 2-17
Port Performance View 2-17
Port Detail View 2-18
ForeSwitchApp Interface Options Panel 2-19
ForeSwitchApp Gauge Control Panel 2-19
ForeUserApp Interface Device View 2-22
ForeUserApp Interface Icons 2-23
ForeUserApp Interface Icon Labels 2-24
Ethernet Interface Label 2-24
Ethernet Network Information Label 2-24
ATM Interface Label 2-24
ATM Administrative Status Label 2-24
ATM Interface Type Label 2-24
Inbound Gauge Label 2-24
Outbound Gauge Label 2-25
ForeUserApp Interface Icons Subviews 2-25
Port Performance View 2-25
Port Detail View 2-26
ForeUserApp Interface Options Panel 2-28
ForeUserApp Gauge Control Panel 2-28
SW_Link Interface Device View 2-29

Chapter 3 Configuration Views

What Is in This Chapter 3-1
Fore ATM Switch Configuration View 3-2
Buffer Table 3-3
Board Table 3-4
Module Table 3-4
Interface Table 3-4
Fore ATM Switch Application Configuration View 3-5
Port Table 3-6
Fore User Application Configuration View 3-7
ForeSwitchApp Port Configuration View 3-8
ForeUserApp Configuration View 3-9
Fore ATM SONET Application Configuration View 3-10

Chapter 4 Event and Alarm Messages

What Is in This Chapter 4-1
Device Events and Alarms 4-1

Chapter 5 Application Views

What Is in This Chapter 5-1
Common Applications Not Covered Here 5-2
The Application Views 5-2
Routing (GenRtrApp) Application 5-5
    Protocol Comparison View 5-5
IP Routing (IP2RtrApp) Application 5-6
    Detail View 5-6
    IP Configuration View 5-7
    IP Routing View 5-8
    IP Address Table View 5-9
    IP Fragmentation View 5-9
    IP Reassembly View 5-10
Switching (ForeSwitchApp) Application 5-11
    Path Tables 5-12
        Originating Path Table 5-12
        Terminating Path Table 5-13
        Through Path Table 5-14
    Channels Tables 5-15
        Input Channels Table 5-15
        Output Channels Table 5-16
    Topology Tables 5-16
        Links Table 5-17
        Switch Cluster Table 5-17
        Switch Board Links/Topology Table 5-18
        NSAP Network Prefix Table 5-18
        NSAP Admin Table 5-18
        NSAP Topology Table 5-19
    Signaling Tables 5-20
        SPANS Path Table 5-20
        SPANS Status Table 5-21
        SPANS Smart PVCs Source Table 5-22
        SPANS Smart PVCs Destination Table 5-23
        Q2931 Admin Table 5-23
        Q2931 Statistics Table 5-25
SONET (Fore_SONET_App) Application 5-26
ForeUserAgent (ForeUserAgent) Application 5-26
ATM User (ForeUserApp) Application 5-26
    Connection Table 5-27

Chapter 6 ForeView

What Is in This Chapter 6-1
Physical View 6-2
Network Map View 6-4
Virtual Path/Channel Tool View 6-5
Channel/Path Tracer View 6-6

Appendix A Overview of Signaling Concepts

Appendix B Discovering Your ATM Network

What Is in This Appendix B-1
Checking the Firmware Version B-2
Checking Firmware of 9A000 and SFCS Devices B-2
Checking Firmware of ASX Devices B-2
Modeling a Seed Switch B-3
Running AutoDiscovery B-4

Appendix C Manual Modeling

What Is in This Appendix C-1
Read Me First C-1
Modeling a Single Device and Workstation C-2
Modeling Multiple Devices and Workstations C-10

Index

Figures

Chapter 1 Introduction

Figure 1-1. Functional Block Diagram of a Device and its Network Connections 1-3
Figure 1-2. ForeRunner Icons 1-4
Figure 1-3. ForeSwitchApp Icons 1-5
Figure 1-4. ATM_Network Icon 1-5
Figure 1-5. ForeUserApp Icons 1-6
Figure 1-6. SW_Link Icon 1-6
Figure 1-7. Workstation Icons 1-7
Figure 1-8. Using Double-Click Zones to Access SPECTRUM Views 1-8
Figure 1-9. Accessing Icon Subviews Menus from the Device Icon 1-9
Figure 1-10. Accessing Icon Subviews menus from Labels 1-9
Figure 1-11. SPECTRUM Views Roadmap 1-10

Chapter 2 Device Views

Figure 2-1. ForeRunner Interface Device View 2-2
Figure 2-2. Interface Icon in the ForeRunner Interface Device View 2-3
Figure 2-3. Gauge Control Panel for the ForeRunner Model Type 2-11
Figure 2-4. ForeSwitchApp Interface Device View 2-14
Figure 2-5. Interface Icon in the ForeSwitchApp Interface Device View 2-15
Figure 2-6. Gauge Control Panel for the ForeSwitchApp Model Type 2-19
Figure 2-7. ForeUserApp Interface Device View 2-22
Figure 2-8. Interface Icon in the ForeUserApp Interface Device View 2-23
Figure 2-9. SW_Link View 2-30

Chapter 5 Application Views

Figure 5-1. ForeRunner Application View in the Icon Mode 5-3
Figure 5-2. Workstation Application View in the List Mode 5-4

Chapter 6 ForeView

Figure 6-1. Physical View 6-2
Figure 6-2. Examples of Foreview Hotspots 6-3
Figure 6-3. Network Map View 6-4
Figure 6-4. Virtual Path/Channel Tool 6-5
Figure 6-5. Channel/Path Tracer View 6-6

Appendix A Overview of Signaling Concepts

Figure A-1. Virtual Channels A-2
Figure A-2. Virtual Path and Virtual Channel Relationship A-2

Appendix B Discovering Your ATM Network

Figure B-1. Firmware Version B-2
Figure B-2. AutoDiscovery Dialog Box B-4

Appendix C Manual Modeling

Figure C-1. Modeling a Single Device and Workstation Conceptual Overview C-2
Figure C-2. Creating the Universe Level Models C-2
Figure C-3. Creating the Workstation Model C-3
Figure C-4. Pasting the ForeUserApp Model into the ATM_Network Model C-4
Figure C-5. Pasting the ForeSwitchApp Model into the ATM_Network Model C-5
Figure C-6. The ForeRunner Off-Page Reference C-6
Figure C-7. Automatically Placed Universe Level Logical Pipe Connection C-6
Figure C-8. Creating the SW_Link Model C-7
Figure C-9. Creating, Pasting, and Resolving the Fanout Model C-8
Figure C-10. The Fanout Cablewalk View C-9
Figure C-11. Logical Pipe Connections in the ATM_Network Model C-9
Figure C-12. Modeling Multiple Devices and Workstations Conceptual Overview C-10
Figure C-13. Completed ATM_Network Model C-11
Figure C-14. Automatically Placed Universe Level Logical Pipe Connections C-12

Tables

Chapter 2 Device Views

Table 2-1. ForeRunner Interface Icon Subviews Menu 2-5
Table 2-2. Packet Breakdown 2-6
Table 2-3. Error Breakdown 2-6
Table 2-4. Discard Breakdown 2-6
Table 2-5. Performance Statistic Color Definitions 2-9
Table 2-6. Totals Mode: Attributes and Corresponding Color 2-12
Table 2-7. Rates Mode: Attributes and Corresponding Color 2-12
Table 2-8. ForeSwitchApp Interface Icon Subviews Menu 2-17
Table 2-9. Performance Statistic Color Definitions 2-17
Table 2-10. Cell Breakdown 2-18
Table 2-11. Totals Mode: Attributes and Corresponding Color 2-20
Table 2-12. Rates Mode: Attributes and Corresponding Color 2-20
Table 2-13. ForeUserApp Interface Icon Subviews Menu 2-25
Table 2-14. Performance Statistic Color Definitions 2-26
Table 2-15. Cell Breakdown 2-26
Table 2-16. ATM Layer 2-26
Table 2-17. AAL0 Cell Breakdown 2-27
Table 2-18. AAL4 Cell Breakdown 2-27
Table 2-19. AAL5 Cell Breakdown 2-28

Chapter 4 Event and Alarm Messages

Table 4-1. Device Events and Alarms 4-1

Chapter 5 Application Views

Table 5-1. Routing Application Icon Subviews Menu Selections 5-5
Table 5-2. IP Routing Application Icon Subviews Menu Selections 5-6
Table 5-3. IP Routing Detail Packet Breakdown 5-6
Table 5-4. IP Routing Detail Error Breakdown 5-7
Table 5-5. IP Routing Detail Discard Breakdown 5-7
Table 5-6. IP Fragmentation Breakdown 5-9
Table 5-7. IP Reassembly Breakdown 5-10
Table 5-8. Switching Application Icon Subviews Menu Selections 5-11
Table 5-9. SONET Application Icon Subviews Menu 5-26
Table 5-10. ATM User Application Icon Subviews Menu Selections 5-26

Preface

Use this guide as a reference for the SPECTRUM management module referred to as "ForeRunner," which is used to manage the Cabletron Systems, Inc., and FORE Systems, Inc., ATM switches described in Chapter 1, *Introduction*.

Before reading this guide, you should be familiar with the SPECTRUM functions described in the ***Operator's Reference*** and the ***Administrator's Reference***.

What Is in This Guide

Chapter	Description
Chapter 1 *Introduction*	Describes the devices managed by this management module, the model types created by SPECTRUM, and how to access views.
Chapter 2 *Device Views*	Describes the views representing the devices.
Chapter 3 *Configuration Views*	Describes the Configuration views and the network management information provided by them.
Chapter 4 *Event and Alarm Messages*	Lists and explains the common event and alarm messages generated in the Event Log or Alarm Manager for the device model types.
Chapter 5 *Application Views*	Describes the Application views and the application-specific information for the devices.
Chapter 6 *ForeView*	Summarizes a separately purchasable management module that is used to set virtual paths, virtual channels, and smart permanent virtual channels.
Appendix A *Overview of Signaling Concepts*	Provides a discussion of the concepts for setting up signaling between devices and workstations.

Chapter	Description
Appendix B *Discovering Your ATM Network*	Describes how to create a seed switch model that is used by SPECTRUM during the AutoDiscovery process to identify the devices in your network.
Appendix C *Manual Modeling*	Describes how to model your network using manual modeling procedures.

Conventions

This guide uses the following conventions:

- Menu selections and buttons referenced in text appear in **bold**; for example, **Configuration** or **Detail**.
- Buttons appear as shadowed boxes when describing their use; for example:

  Help

- Menu navigation appears in order of selection; for example, **View ->Icon Subviews -> Utilities -> Application**.
- Referenced chapter titles and section headings appear in *italics*.
- Referenced documents appear in ***bold italics***.
- References in blue are hypertext links for online documents.

Terminology

The following terminology is used throughout this guide.

- A Cabletron or FORE Systems ATM switch managed by the ForeRunner management module software is referred to as the "device."
- Some SPECTRUM application names have the prefix "Fore," which applies to Cabletron as well as FORE Systems devices described in this guide. For example, "ForeSwitchApp" is the name of an application that is available to all Cabletron and FORE Systems devices described herein. (Model types are described in Chapter 1, *Introduction*. Applications are described in Chapter 5, *Application Views*.)

Related SPECTRUM Documentation

It is important when using this guide that you have a clear understanding of SPECTRUM functionality and navigation techniques as described in the following recommended documentation:

Operator's Reference

Administrator's Reference

Report Generator User's Guide

Application View Reference

Getting Started with SPECTRUM 4.0 for Operators

Getting Started with SPECTRUM 4.0 for Administrators

How to Manage Your Network with SPECTRUM

SPECTRUM System AutoDiscovery User's Guide

This guide also references the following documents:

SPECTRUM Portable Management Application Tools Guide

SPECTRUM Routing Services Management Module Guide

SPECTRUM Enterprise Alarm Manager User's Guide

SPECTRUM ATM Switch Discovery Process

Other Related Documentation

Refer to the following documentation for more information on managing TCP/IP-based networks:

Martin, James, Kathleen Kavanagh Chapman, Joe Leben. ***Local Area Networks, Architectures and Implementations***, 2nd ed. Englewood Cliffs, NJ: Prentice Hall, 1994.

Rose, Marshall T. ***The Simple Book — An Introduction to Management of TCP/IP-based Internets***. Performance Systems International, Inc.

Stallings, William. ***Data and Computer Communications***, 4th ed. New York: Macmillan Publishing Company, 1994.

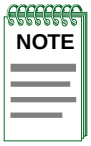
Tanenbaum, Andrew S. ***Computer Networks***, 3rd ed. Englewood Cliffs, NJ: Prentice Hall, 1996.

Chapter 1

Introduction

What Is in This Chapter

This chapter introduces the SPECTRUM ForeRunner management module, which supports the Cabletron Systems, Inc., and FORE Systems, Inc., ATM devices described below. This chapter also describes the SPECTRUM models and icons used to manage the devices.



Modeling instructions are provided in Appendix B, *Discovering Your ATM Network*, and Appendix C, *Manual Modeling*.

This chapter covers the following topics:

- *The Devices*
- *ATM/ForeRunner Overview* on page 1-2
- *SPECTRUM Model Types and Icons* on page 1-4
- *SPECTRUM Support* on page 1-7
- *SPECTRUM Views Roadmap* on page 1-9

The Devices

This management module supports the following devices:

- Cabletron's 9A000 ATM Switch Module for the MMAC-Plus.
- Cabletron's SFCS-200BX and SFCS-1000 SecureFast Cell Switches.
- FORE Systems' ASX-100, ASX-200 series, and ASX-1000 ATM Switches.

The 9A000 is a dual-slot MMAC-Plus module that provides an aggregate 2.5 Gbps of ATM switching capacity for up to 24 workstations or ATM devices. Its four network module slots can provide a range of LAN and WAN interfaces from 1.5 to 622 Mbps to accommodate ATM.

The SFCS-200BX and SFCS-1000 meet the needs of LAN backbone networks and offer a variety of connectivity options including LAN to ATM access, interswitch links, and WAN access. The SFCS-200BX is a 2.5 Gbps modular ATM switch for the wiring closet with four network module slots. The SFCS-1000 is a modular, 10 Gbps backbone ATM switch that includes two 2.5 Gbps switch modules, each containing four network module slots. It provides connectivity for up to 96 ATM servers or LAN access devices.

The ASX100, ASX200 series, and ASX1000 are stand-alone switches that provide workgroup, LAN, LAN backbone, and WAN access support. They are configurable from 2 to 96 ports, offer a switching capacity ranging from 2.5 to 10 Gbps, and support LAN and WAN interface speeds of 34 to 155 Mbps.

ATM/ForeRunner Overview

Asynchronous Transfer Mode (ATM) is based on the transmission of fixed-length (53-byte) cells of data. Contrast this with an Ethernet LAN, which transmits variable-length packets ranging in size from 64 to over 1500 bytes of data. ATM's use of small, fixed-length data cells allows for improved traffic management and traffic shaping.

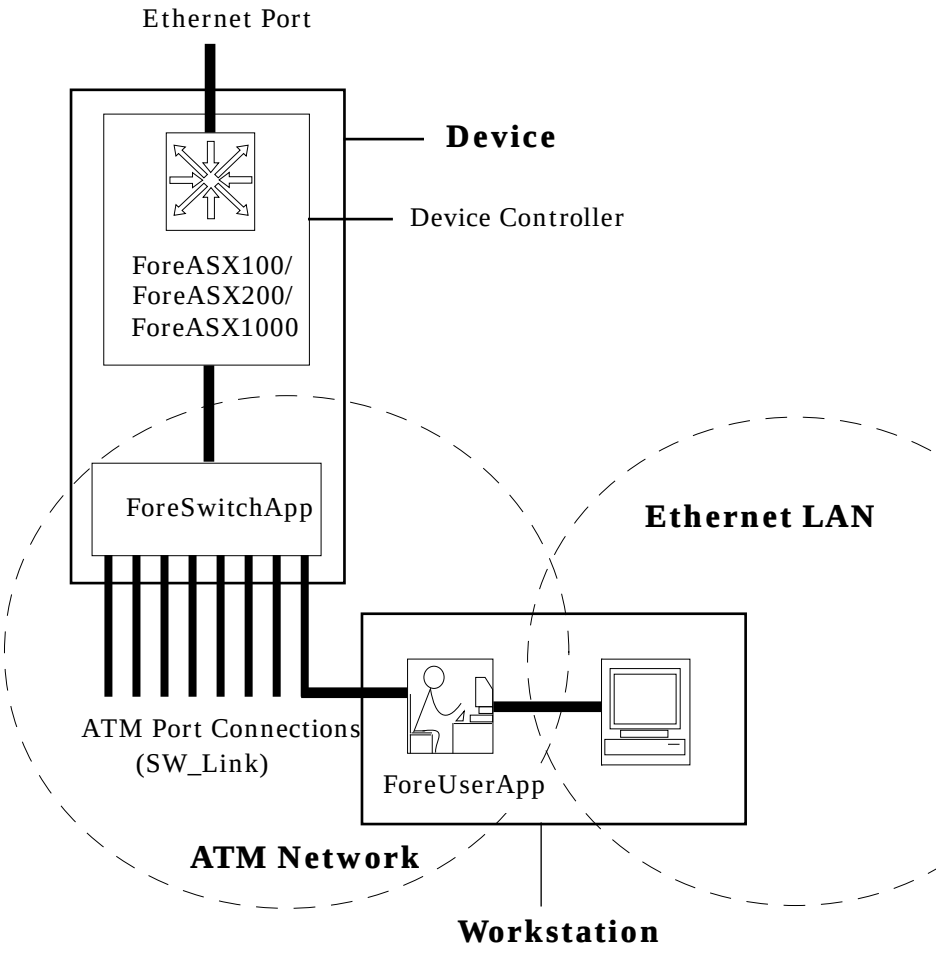
ATM is a connection-oriented network communication architecture, which generally means that it transmits data through pre-established virtual channels (circuits), similar to telephone calls. Virtual channels may be established automatically by Switched Virtual Circuit (SVC) signaling or they may be set up manually by the network administrator to form Permanent Virtual Circuits (PVCs).

Each ATM cell contains a five-byte header and 48 bytes of payload. The header includes a Virtual Path Identifier (VPI) and a Virtual Channel Identifier (VCI). These identifiers are used by ATM switches to determine the correct channels to transmit particular cells. Transmission is controlled by statistical multiplexing, which awards bandwidth (channels) to devices ready to send data on a first come, first served basis. (For more information on virtual paths and virtual channels, see Appendix A, *Overview of Signaling Concepts*.)

The combination of small, fixed-length data cells and the efficient use of bandwidth (among other things) allow ATM switches to communicate time-critical video and audio data along with other computer data across the ATM network. In an end-to-end transmission across a mixed LAN/ATM/LAN network, packets transmitted by a LAN workstation to an ATM switch are segmented into cells for high speed transmission through ATM channels. At the receiving end, cells are reassembled into packets for use by another LAN workstation.

Figure 1-1 is a functional block diagram of a device and its ATM and LAN network connections. The device contains either a 9A000, SFCS, or ASX controller. (SPECTRUM models the devices as either ForeASX100, ForeASX200, or ForeASX1000 model types, as described later in this chapter.)

Figure 1-1. Functional Block Diagram of a Device and its Network Connections



Functionally, a device is divided into two blocks; the device controller and the ForeSwitchApp. The ForeSwitchApp is grouped by function into the ATM network with the ForeUserApp, which is itself contained within a user node such as a multi-homed workstation. (A multi-homed workstation is a workstation containing firmware that makes it part of the Ethernet and ATM networks to which it is connected.) Therefore, the workstation's ForeUserApp provides the connection between the ATM network and the Ethernet LAN.

Figure 1-1 provides an indication of how SPECTRUM models the devices, the network applications, and the workstations in your network.

SPECTRUM Model Types and Icons

SPECTRUM uses the model types and icons described in this section to represent a device and its components. The model types are as follows:

- ForeRunner (uses 9A000, ForeASX200, etc., as described below)
- ForeSwitchApp
- ATM_Network
- ForeUserApp
- SW_Link

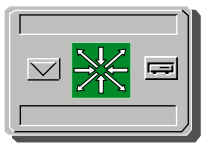
The workstation is modeled as a generic SNMP device (GnSNMPDev). ForeSwitchApp and ForeUserApp are located in the ATM_Network's Device Topology view. (Refer to the ***Operator's Reference*** for a description of the Device Topology view.)

ForeRunner

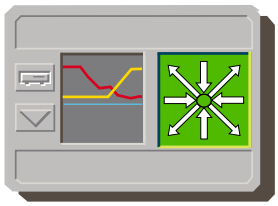
The model types representing the devices use names that approximate the device names. For example, ForeASX1000 is the model type name for the FORE Systems ASX1000 ATM switch; 9A000 is the model type name for the Cabletron 9A000 ATM Switch Module for the MMAC-Plus.

The device models appear as routers at the Topology, Universe, and Location (room, rack, and panel) levels. Figure 1-2 shows an example of the ForeRunner Topology and Location view icons.

Figure 1-2. ForeRunner Icons



Topology View Icon

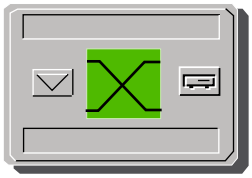


Location View Icon

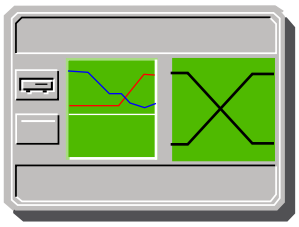
ForeSwitchApp

This model type represents the switch application software. When a ForeRunner model type is created, SPECTRUM automatically creates the ForeSwitchApp model and places it in the ATM part of the ForeRunner model's Device Topology view. Figure 1-3 shows an example of the ForeSwitchApp Topology and Location View icons.

Figure 1-3. ForeSwitchApp Icons



Topology View Icon

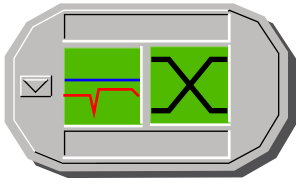


Location View Icon

ATM_Network

This model type is a conceptual model that represents the ATM network. The ForeUserApp and the ForeSwitchApp models are placed into this model's Device Topology view. Figure 1-4 shows an example of an ATM_Network icon.

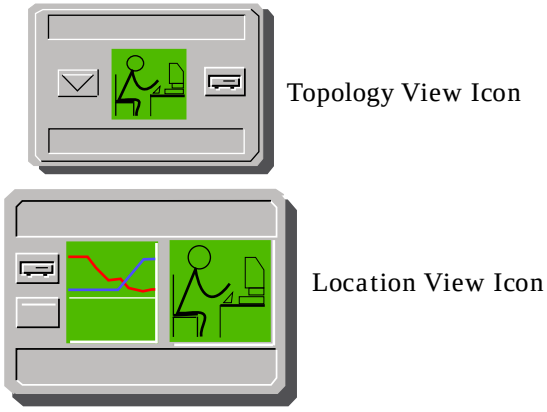
Figure 1-4. ATM_Network Icon



ForeUserApp

This model type represents the workstation application that is the connection point from the Ethernet LAN to the ATM network. When a workstation model is created with GnSNMPDev, SPECTRUM automatically creates the ForeUserApp model and places it in the GnSNMPDev workstation's Device Topology view. Figure 1-5 shows an example of the ForeUserApp Topology and Location View icons.

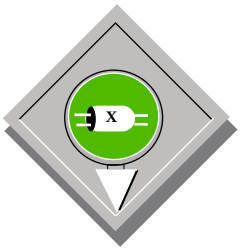
Figure 1-5. ForeUserApp Icons



SW_Link

This model type represents the condition of the physical port connections for both access ports and network ports. A Fanout model is created in the SW_Link Device Topology view and copied to the adjacent ForeSwitchApp and ForeUserApp. Figure 1-6 shows an example of an SW_Link icon.

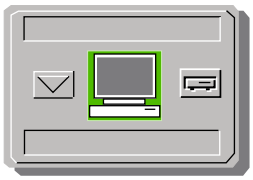
Figure 1-6. SW_Link Icon



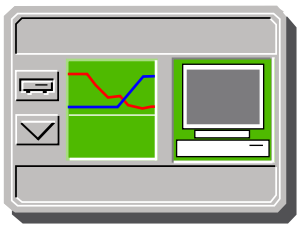
Workstation

This model type represents the workstation that contains ForeUserApp. Figure 1-7 shows an example of the Workstation Topology and Location View icons.

Figure 1-7. Workstation Icons



Topology View Icon



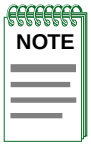
Location View Icon

SPECTRUM Support

Refer to Appendix B, *Discovering Your ATM Network*, Appendix C, *Manual Modeling*, and the ***Administrator's Reference*** for modeling instructions.

Accessing SPECTRUM Views

Icons and labels provide access to SPECTRUM views that display device-specific information. Access these views using double-click zones (Figure 1-8) or the Icon Subviews menu (Figure 1-9 and Figure 1-10).



The Icon Subviews menu often provides access to more device-specific views than are available via the double-click zones.

Figure 1-8. Using Double-Click Zones to Access SPECTRUM Views

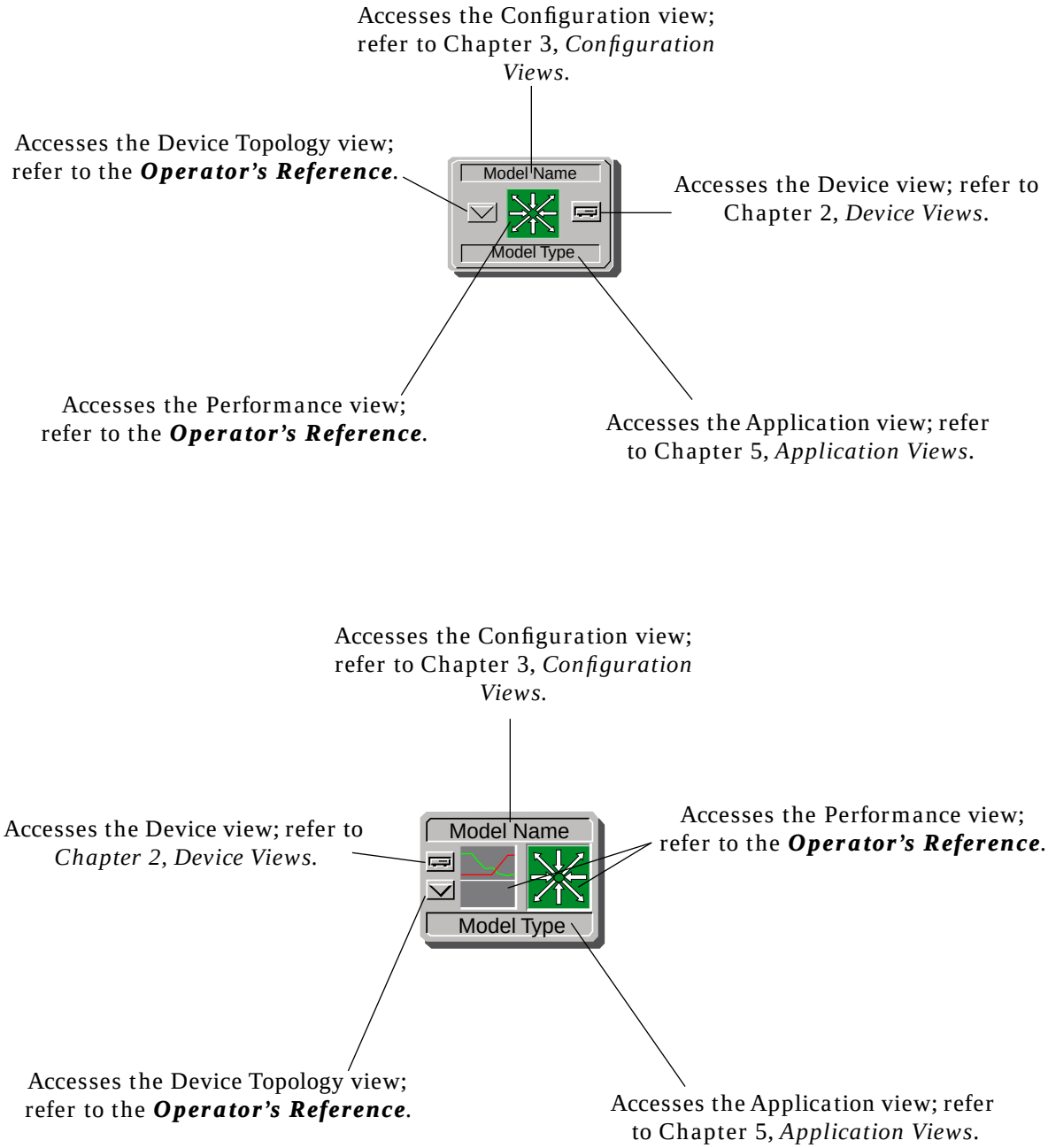

Accesses the Configuration view; refer to Chapter 3, *Configuration Views*.
Accesses the Device Topology view; refer to the ***Operator's Reference***.
Model Name
Model Type
Accesses the Device view; refer to Chapter 2, *Device Views*.
Accesses the Performance view; refer to the ***Operator's Reference***.
Accesses the Application view; refer to Chapter 5, *Application Views*.
Accesses the Configuration view; refer to Chapter 3, *Configuration Views*.
Accesses the Device view; refer to *Chapter 2, Device Views*.
Model Name
Model Type
Accesses the Performance view; refer to the ***Operator's Reference***.
Accesses the Device Topology view; refer to the ***Operator's Reference***.
Accesses the Application view; refer to Chapter 5, *Application Views*.

Figure 1-9. Accessing Icon Subviews Menus from the Device Icon

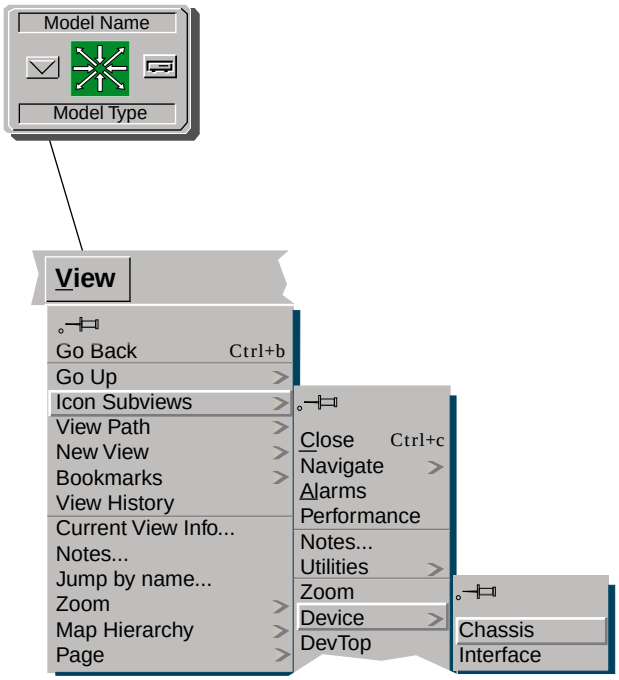
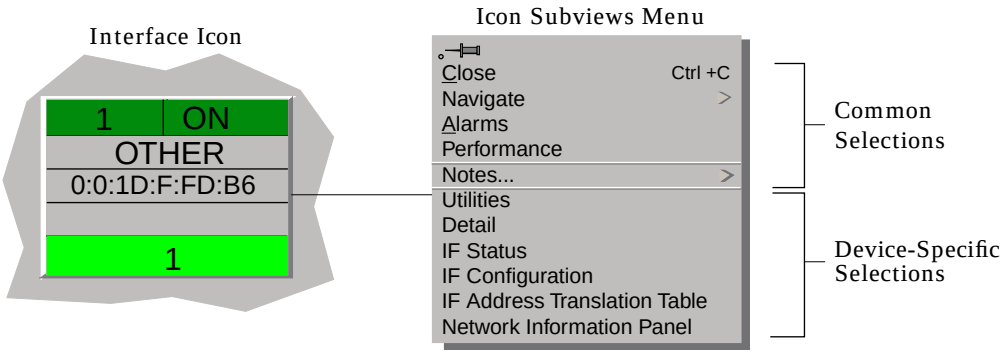


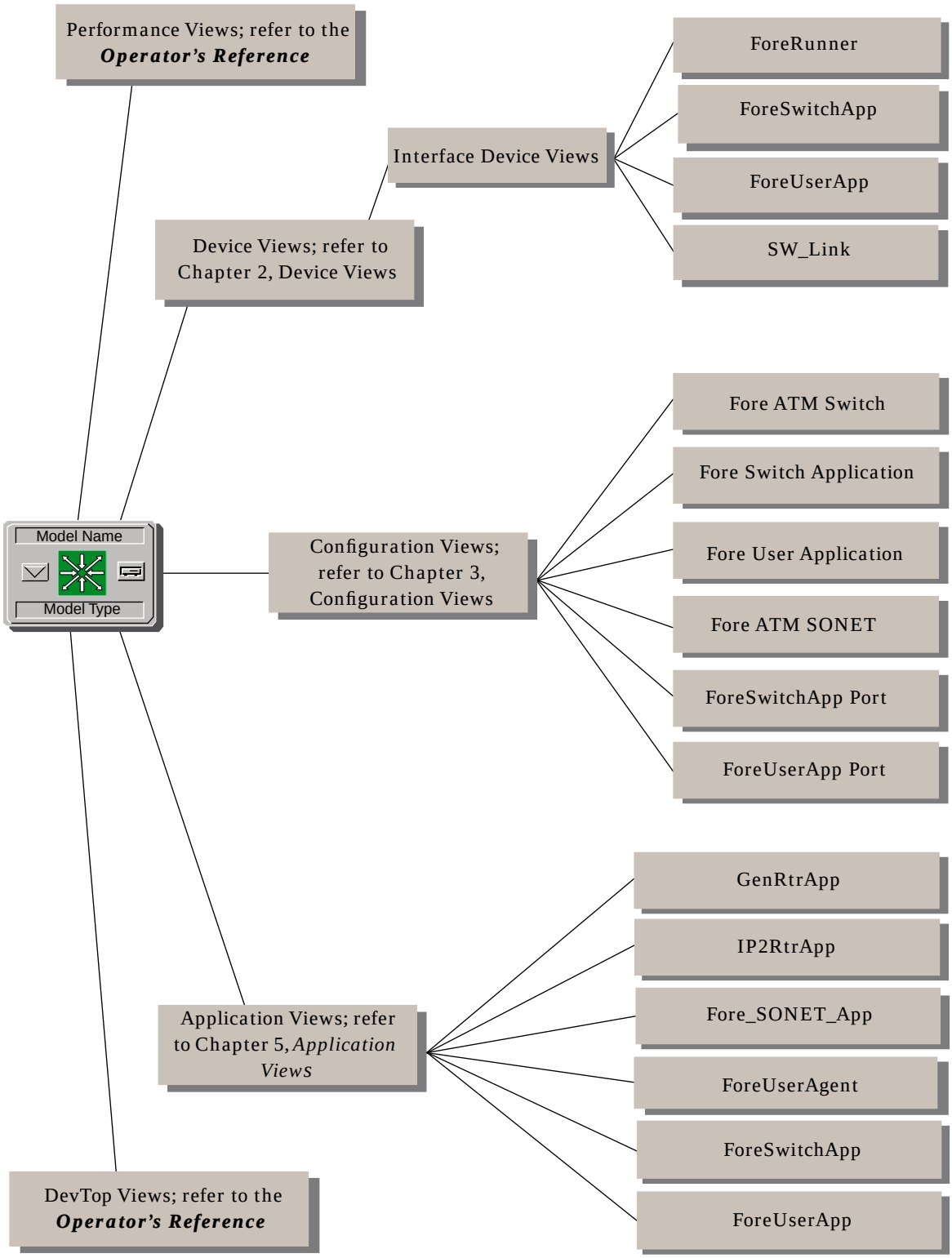
Figure 1-10. Accessing Icon Subviews menus from Labels



SPECTRUM Views Roadmap

Figure 1-11 shows a "roadmap" of the SPECTRUM views for this device. These views are accessible from double-click zones (Figure 1-8) and Icon Subviews menus (Figure 1-9 and Figure 1-10).

Figure 1-11. SPECTRUM Views Roadmap



Chapter 2

Device Views

What Is in This Chapter

This chapter describes the Interface Device views and subviews available for the devices. SPECTRUM provides an Interface Device view for each of the following model types:

- ForeRunner (9A000, ForeASX200, etc.) on page 2-2
- ForeSwitchApp on page 2-14
- ForeUserApp on page 2-22
- SW_Link on page 2-29

This chapter describes the Interface icons and Interface Options panel contained in the Interface Device view of each model type.

The procedures for accessing the Interface Device views are the same for all model types. Use one of the following procedures:

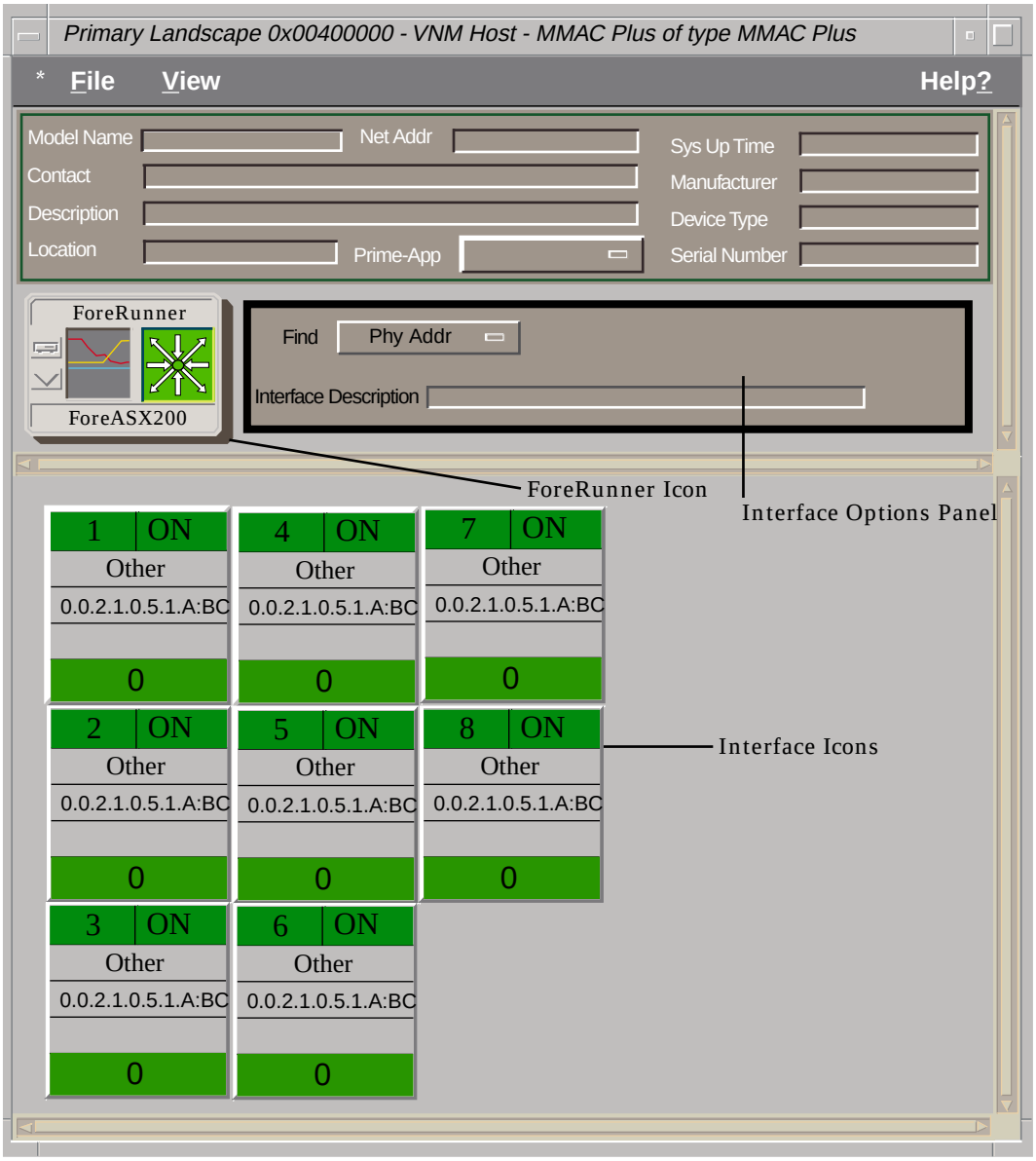
- Double-click the Device view access button on the model type icon.
- Highlight the model type icon and select **View -> Icon Subviews -> Device**.
- Click and hold the model type icon using the appropriate mouse button (right or middle) to bring up the Pop-up Navigator menu and then select **Device**.

In general, the Interface Device view provides dynamic configuration and performance information for each interface. The view represents both physical and conceptual devices. If the configuration changes, SPECTRUM modifies the Interface Device view after the next polling cycle to reflect the new configuration. The Interface Device view also provides a model type icon that allows you to monitor the device operation and to access other device-specific views.

ForeRunner Interface Device View

An example of the Interface Device view for the ForeRunner model type is shown in Figure 2-1.

Figure 2-1. ForeRunner Interface Device View



ForeRunner Interface Icons

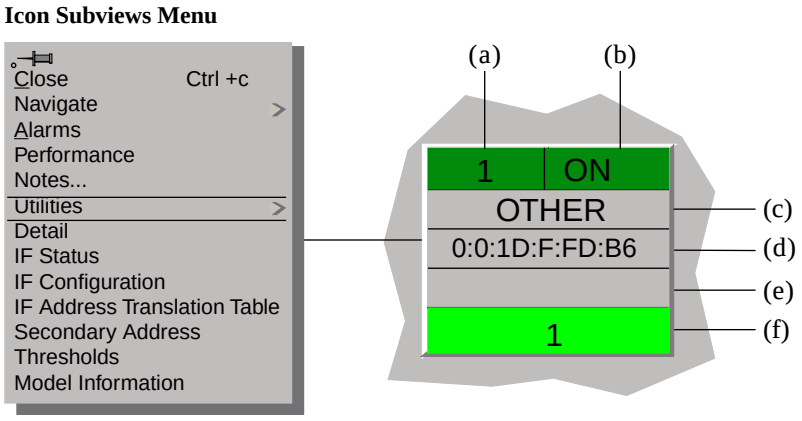
These icons represent the interfaces of the device. The icons identify the type of interface or port and provide statistical information. Figure 2-2 shows an example of a ForeRunner Interface icon, its Icon Subviews menu, and its labels/double-click zones.

NOTES

The callouts (a through f) displayed in the illustration below identify the label and, if available, the view to which it provides double-click zone access. For example, the icon area referred to by callout (b) displays the administrative status and provides double-click access to the Interface Status view.

The menu displayed in the illustration is the Icon Subviews menu for that Interface icon.

Figure 2-2. Interface Icon in the ForeRunner Interface Device View



a. Interface Label

b. Administrative Status Label/Interface Status View

c. Interface Type Label/Fore Switch Interface Configuration View

d. MAC Address Label/Interface Address Translation Table View

e. Address Label/ Secondary Address View

f. Gauge Label/ Performance View

ForeRunner Interface Icon Labels

This section describes the labels on the Interface Icon. See Figure 2-2.

Interface Label

This label displays the interface (port) number.

Administrative Status Label

This label displays the status of this interface for the primary application selected (Routing, MIB-II, etc.). The possible states are ON (Green), OFF (Blue), and Testing (Red). Double-click this label to open the *Interface Status View* described on Page 2-6.

Interface Type Label

This label displays the interface type. All of the devices display **Other** as the interface type. Double-click this label to open the *Fore Switch Interface Configuration View* described on Page 2-7.

MAC Address Label

This label displays the address of the device interface. Double-click this label to open the *Interface Address Translation Table View* described on Page 2-7.

Address Label

This label displays the address or mask. The default is the address. Double-click this label to open the *Secondary Address View* described on Page 2-8.

To change this label's display, do the following:

1. Double-click the label to open the Secondary Address view.
2. Select the address you wish to display and click **OK**.

Gauge Label

This label displays the performance statistic determined by the Gauge Control Panel for this interface. (See *ForeRunner Gauge Control Panel* on page *2-10* for more information.) Double-click this label to open the *Performance View* described on Page 2-8.

ForeRunner Interface Icon Subviews

Table 2-1 lists the Interface icon device-specific subviews menu selections. See Chapter 1, *Introduction*, for information on accessing views.

Table 2-1. ForeRunner Interface Icon Subviews Menu

Menu Selection	Description
Detail	Opens the *Interface Detail View* described on Page 2-5.
IF Status	Opens the *Interface Status View* described on Page 2-6.
IF Configuration	Opens the *Fore Switch Interface Configuration View* described on Page 2-7.
IF Address Translation Table	Opens the *Interface Address Translation Table View* described on Page 2-7.
Secondary Address Panel	Opens the *Secondary Address View* described on Page 2-8.
Thresholds	Opens the *Interface Threshold View* described on Page 2-8.
Model Information	Opens the Model Information view described in the ***Operator's Reference***.

The following sections describe the views that are accessible from the Icon Subviews menu and via double-click zones on the Interface icon. See Figure 2-2 on page 2-3.

Interface Detail View

This view provides color-coded pie charts that display transmission statistics for the selected interface. Three buttons at the bottom of each pie chart select the way in which the data is represented (**Total**, **Delta**, **Accum**). Another button, **Clear**, works in conjunction with the **Accum** button. For more information on pie charts and the use of these buttons, refer to the ***Operator's Reference***. Table 2-2, Table 2-3, and Table 2-4 list the information provided by these pie charts.

Table 2-2. Packet Breakdown

Statistic	Definition
Delivered	Packets delivered to a higher level protocol.
Transmitted	Packets transmitted.
Errors	Packets received containing errors.
Discards	Packets discarded.

Table 2-3. Error Breakdown

Statistic	Definition
In Errors	The total number of ICMP messages that the SNMP device received or attempted to transmit containing errors.
Out Errors	The total number of ICMP messages that the SNMP device did not transmit because of errors.

Table 2-4. Discard Breakdown

Statistic	Definition
Unknown	Unknown packet types received.
In No Resource	Received packets discarded, even though no errors were encountered to prevent their continued processing. Such packets may have been discarded to increase buffer space.
Out No Resource	Transmitted packets discarded, even though no errors were encountered to prevent their continued processing. Such packets may have been discarded to increase buffer space.

Interface Status View

This view provides the following information for the selected interface:

Operational Status
A read-only indicator displaying the current operational state of the interface. The possible states are ON, OFF, Testing, and Default.

Administrative Status
A drop-down menu button that allows you to select the operational state of the interface. The possible states are ON, OFF, Testing, and Default.

Fore Switch Interface Configuration View

This view displays the following information for the selected interface:

Operation Status
A read-only indicator that shows the current operational state of the port (ON, OFF, Testing, or Default).

Admin. Status
A drop-down menu button that allows you to select the operational state of the port (ON, OFF, or Testing). This can be seen on the Administrative Status Label.

Description
The description of the interface.

Network Name/Address
The network name and IP address of the interface.

Physical Address
The physical (MAC) address of the port.

Bandwidth
The estimated bandwidth of the interface measured in bits per second. For interfaces that do not vary in bandwidth or for which no accurate estimate can be made, a nominal bandwidth is provided.

Packet Size
The size of the packets being transmitted or received.

Interface Address Translation Table View

This view displays the following information for the selected interface:

Interface Index
The value identifying the port.

Physical Address
The physical (MAC) address of the port.

Sort
Sorts the table columns.

Find
Searches for a particular entry in the table.

Update
Updates the table with the latest configuration information.

Secondary Address View

This view displays the following information for the selected interface:

Address
The IP address of the interface.

Mask
The mask address of the interface.

Interface Threshold View

This view displays the following information for the selected interface:

Load Threshold
The ON and OFF values set to determine the point at which a load alarm will be turned on or off.

Packet Rate Threshold
The ON and OFF values set to determine the point at which a packet transmission alarm will be turned on or off.

Error Rate Threshold
The ON and OFF values set to determine the point at which an error alarm will be turned on or off.

% Discarded Threshold
The ON and OFF values set to determine the point at which an alarm will be turned on or off.

Performance View

This view displays a breakdown of statistics for the selected interface. A multi-attribute line graph shows the port activity. You can change the graph properties via the **Graph Properties** drop-down menu and **Lin/Log** toggle described below.

This view also contains tables displaying transmission statistics. Current, average, and peak values are shown. The attributes displayed are pre-selected and the colors used represent different statistics.

Table 2-5 lists the color definitions for the application. Refer to the ***Operator's Reference*** for more information on the multi-attribute line graph.

Table 2-5. Performance Statistic Color Definitions

Statistic	Color
Load	Green
Packet Rate	Blue
% Error	Red
% Discarded	Grey

Graph Properties
This drop-down menu provides three selections that allow you to change the graph presentation. **Scroll To Date-Time** sets the year, month, day, hour, minute, and second to begin recording statistics. **Change Time Scale** sets the horizontal axis of the graph in one-hour increments and allows you set the graph to depict live data. **Data Logging** allows you to log polled data in the database.

Lin/Log
Toggles the graph between a linear and logarithmic scale presentation.

Detail
Accesses the *Interface Detail View* described on Page 2-5.

Config
Accesses the *Fore Switch Interface Configuration View* described on Page 2-7.

Threshold
Accesses the *Interface Threshold View* described on Page 2-8.

Transmit
Accesses transmit-specific statistics on the Performance view described in the ***Operator's Reference***. All of the monitored fields in the table are prefixed with "Out."

Receive
Accesses receive-specific statistics on the Performance view described in the ***Operator's Reference***. All of the monitored fields in the table are prefixed with "In."

Events
Accesses the Event Log described in the ***Operator's Reference***.

Alarms

Accesses the Alarm Manager application described in the ***SPECTRUM Enterprise Manager User's Guide***.

ForeRunner Interface Options Panel

This panel (see Figure 2-1 on page 2-2) allows you to modify the presentation of a highlighted Interface icon. Double-click a non-text area of this panel to open the ForeRunner Gauge Control Panel described below.

The Interface Options panel provides the following information.

Find
This drop-down menu allows you to search for a model or group of models based on the physical address, IP address, model type, or network name. Refer to the ***Operator's Reference*** for more information.

Interface Description
This field describes the interface of the highlighted Interface icon. If no Interface icon is highlighted, the field is empty or shows the interface previously highlighted.

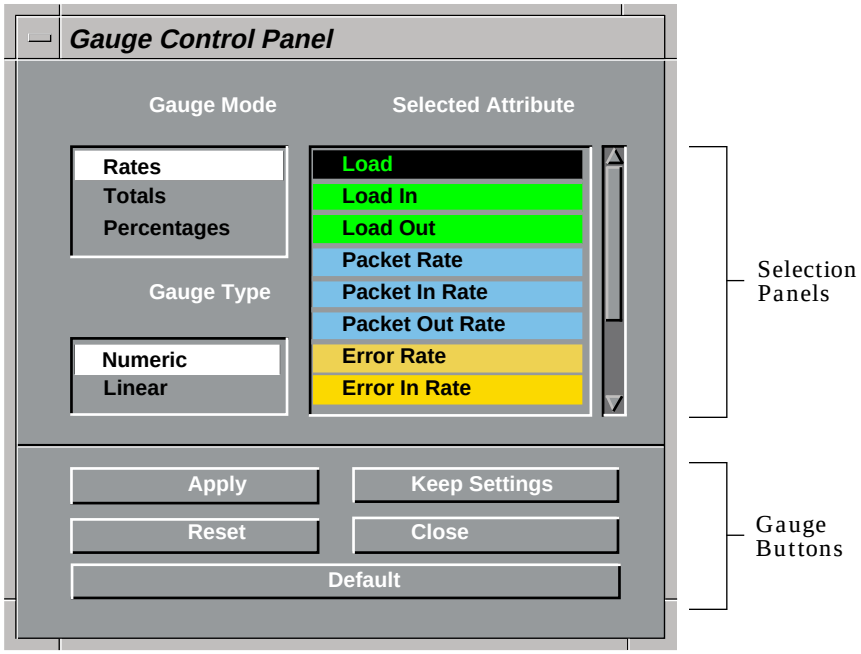
ForeRunner Gauge Control Panel

This view (see Figure 2-3) allows you to change the type of statistical information displayed on the Gauge label of the Interface icon.

To access the Gauge Control Panel, double-click the background of the Interface Options panel, or do the following:

1. Highlight the Interface Options panel.
2. Select **View -> Icon Subviews -> Gauge Control Panel**.

Figure 2-3. Gauge Control Panel for the ForeRunner Model Type



The Gauge Control Panel contains the following selection panels and gauge buttons:

- Gauge Mode selection panel
- Selected Attribute selection panel
- Gauge Type selection panel
- Gauge buttons

Gauge Mode

This selection panel allows you to select the type of information shown on the Gauge label of the Interface icon: Rates, Totals, or Percentages. The Percentages selection displays the percentage of the selected interface compared to the rest of the interfaces.

The color displayed on the Interface icon's Gauge label depends upon the particular mode and statistical attribute selected. Table 2-6 and Table 2-7 list the attributes and their corresponding colors for the Totals mode and Rates mode, respectively.

Table 2-6. Totals Mode: Attributes and Corresponding Color

Selected Attribute	Color
In Errors	Orange
Out Error	Orange
In Packets	Blue
Out Packets	Blue
Unknown Protocols	Yellow
In No Resource	Tan
Out No Resource	Tan
In Octets	Green
Out Octets	Green

Table 2-7. Rates Mode: Attributes and Corresponding Color

Selected Attribute	Color
Load	Green
Load In	Green
Load Out	Green
Packet Rate	Blue
Packet In Rate	Blue
Packet Out Rate	Blue
Error Rate	Orange
Error In Rate	Orange
Error Out Rate	Orange
Discard Rate	Tan
Discard In Rate	Tan
Discard Out Rate	Tan

Selected Attribute
This selection panel allows you to select the statistical attribute displayed on the Interface icon's Gauge label. The label changes color to reflect the attribute selected.

Gauge Type
This selection panel allows you to select either a numeric or linear display on the Gauge label.

Apply
Applies the current settings to the Gauge label for as long as the view is open.

Keep Settings
Saves the current settings while SpectroGRAPH is running. The settings return to their default values when you restart SpectroGRAPH.

Reset
Returns the settings to the previously saved values.

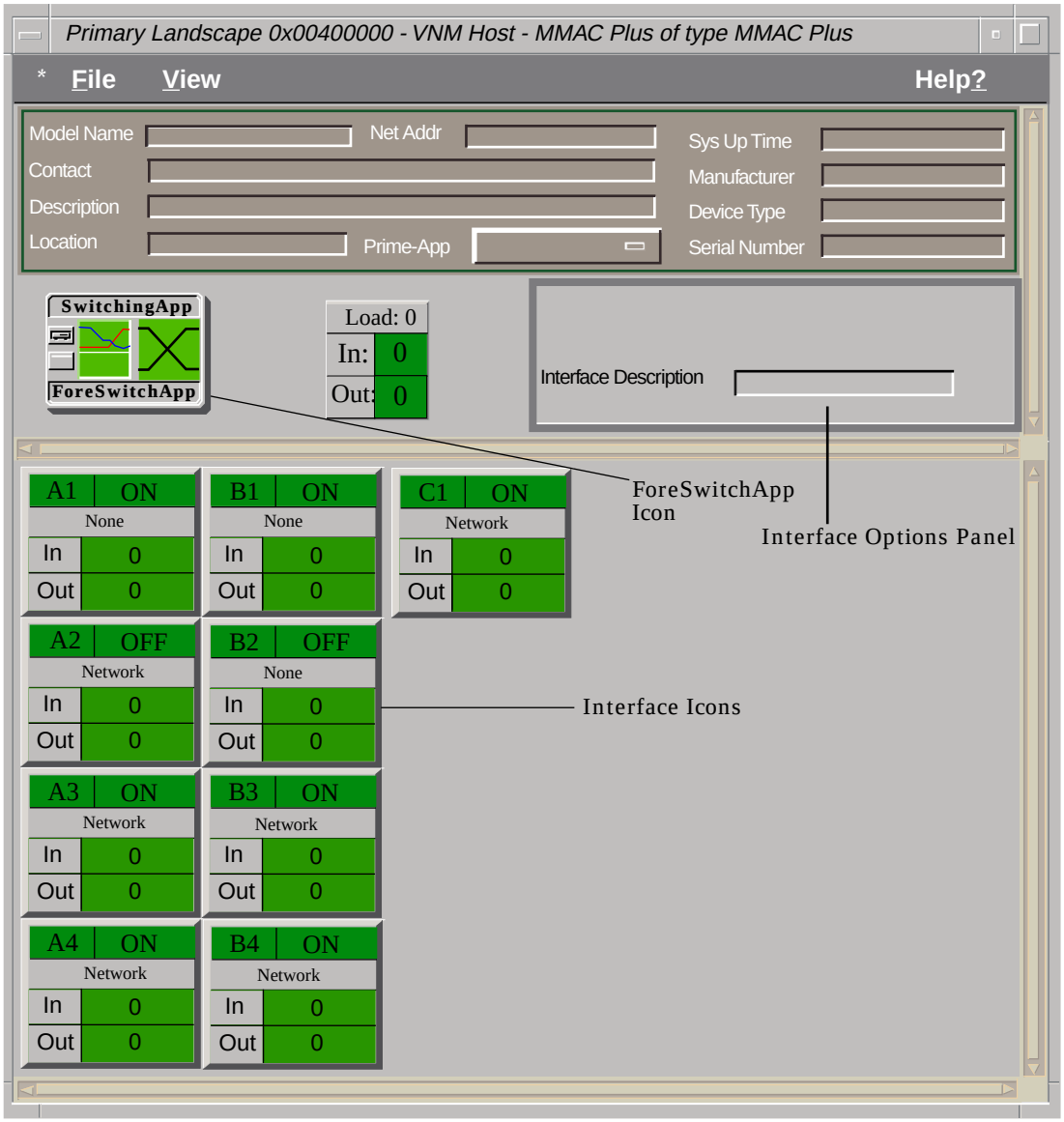
Close
Closes the Gauge Control Panel.

Default
Returns the settings to the SPECTRUM default.

ForeSwitchApp Interface Device View

Figure 2-4 shows an example of the Interface Device view for the ForeSwitchApp model type.

Figure 2-4. ForeSwitchApp Interface Device View



ForeSwitchApp Interface Icons

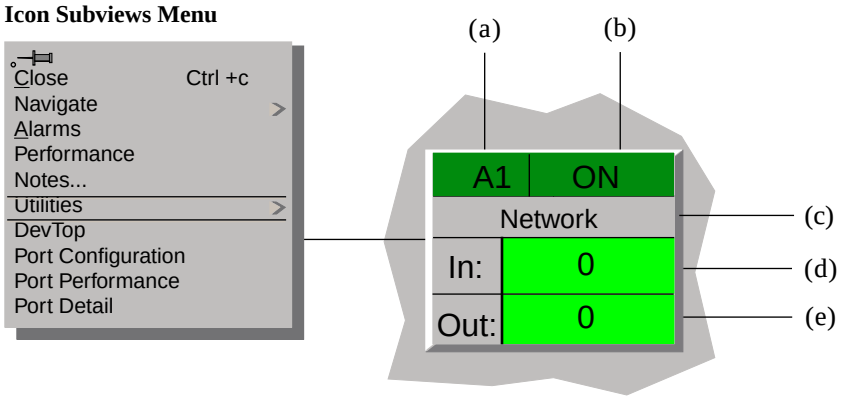
These icons represent the interfaces of the device. The icons identify the type of interface or port and provide statistical information. Figure 2-5 shows an example of a ForeSwitchApp Interface icon, its Icon Subviews menu, and its labels/double-click zones.

NOTES

The callouts (a through e) displayed in the illustration below identify the label and, if available, the view to which it provides double-click zone access. For example, the icon area referred to by callout (b) displays the interface's administrative status and provides double-click access to the Port Configuration view.

The menu displayed in the illustration is the Icon Subviews menu for that Interface icon.

Figure 2-5. Interface Icon in the ForeSwitchApp Interface Device View



a. Interface Label/DevTop View

b. Administrative Status Label/Port Configuration View

c. Interface Type Label

d. Inbound Gauge Label/Port Performance View

e. Outbound Gauge Label/Port Detail View

ForeSwitchApp Interface Icon Labels

This section describes the labels on the ForeSwitchApp Interface icon. See Figure 2-5.

Interface Label

This label displays the interface (port) number. Double-click this label to open the Device Topology view described in the ***Operator's Reference***.

Administrative Status Label

This label displays the status of this interface for the primary application selected (Routing, MIB-II, etc.). The possible states are ON (Green), OFF (Blue), and Testing (Red). Double-click this label to open the *ForeSwitchApp Port Configuration View* described in Chapter 3, *Configuration Views*.

Interface Type Label

This label displays the type of interface.

Inbound Gauge Label

This label displays the performance statistic determined by the Gauge Control Panel for this interface. The *ForeSwitchApp Gauge Control Panel* is described on Page 2-19. Double-click this label to open the *Port Performance View* described on Page 2-17.

Outbound Gauge Label

This label displays the performance statistic determined by the Gauge Control Panel for this interface. The *ForeSwitchApp Gauge Control Panel* is described on Page 2-19. Double-click this label to open the *Port Detail View* described on Page 2-18.

ForeSwitchApp Interface Icon Subviews

This section describes the views that are accessible from the Icon Subviews menu and via double-click zones on the Interface icon (see Figure 2-5). Table 2-8 lists the Interface icon device-specific subviews menu selections. For information on accessing device-specific subviews menus, see Chapter 1, *Introduction*.

Table 2-8. ForeSwitchApp Interface Icon Subviews Menu

Menu Selection	Description
DevTop	Opens the Device Topology view described in the ***Operator's Reference.***
Port Configuration	Opens the *ForeSwitchApp Port Configuration View* described on Page 3-8.
Port Performance	Opens the *Port Performance View* described on Page 2-17.
Port Detail	Opens the *Port Detail View* described on Page 2-18.

Port Performance View

This view displays statistics for the port (Interface icon) selected. A multi-attribute line graph shows the port activity. You can change the graph properties via the **Graph Properties** drop-down menu and **Lin/Log** toggle described below. This view also contains a table displaying transmission statistics. Current, average, and peak values are shown. The attributes displayed are pre-selected and the colors used represent different statistics as described in Table 2-9. Refer to the ***Operator's Reference*** for more information on the multi-attribute line graph.

Table 2-9. Performance Statistic Color Definitions

Statistic	Color
In Load	Green
In Cell Rate	Blue
Error Rate	Red
Out Load	Yellow
Out Cell Rate	Blue
% Discard	Grey

Graph Properties

This drop-down menu provides three selections that change the graph presentation. **Scroll To Date-Time** allows you to set the year, month, day, hour, minute, and second to begin recording statistics. **Change Time Scale** sets the horizontal axis of the graph in one-hour increments. You can also set the graph to depict live data. **Data Logging** allows you to log polled data in the database.

Lin/Log

Toggles the graph between a linear and logarithmic scale presentation.

Detail

Accesses the Port Detail view described below.

Events

Accesses the Event Log described in the ***Operator's Reference***.

Alarms

Accesses the Alarm Manager application described in the ***SPECTRUM Enterprise Manager User's Guide***.

Port Detail View

This view provides a color-coded pie chart displaying port transmission statistics. Three buttons at the bottom of the pie chart select the way in which the data is represented (**Total**, **Delta**, **Accum**). Another button, **Clear**, works in conjunction with the **Accum** button. Refer to the ***Operator's Reference*** for more information on pie charts and the use of these buttons. Table 2-10 lists the information provided by the pie chart.

Table 2-10. Cell Breakdown

Statistic	Description
Received	The number of ATM cells received
Transmitted	The number of ATM cells transmitted
Errors	The number of ATM cells received containing errors
Discards	The number of ATM cells discarded

ForeSwitchApp Interface Options Panel

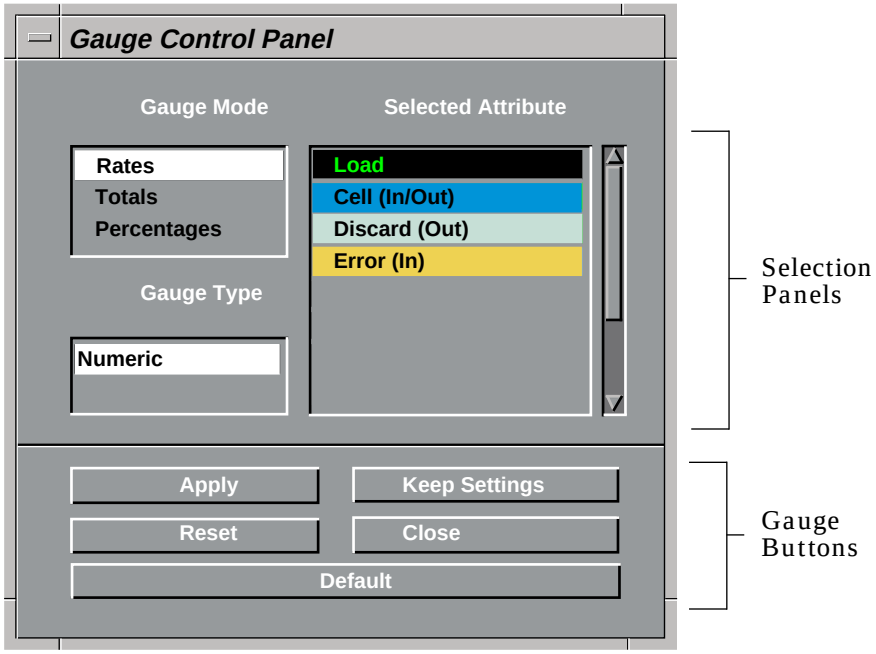
This area of the Interface Device view (see Figure 2-4 on page 2-14) allows you to modify the presentation of a highlighted Interface icon. Double-click a non-text area of this panel to open the Gauge Control Panel described below. The Interface Options panel provides the following information.

Interface Description
This field provides a description of the highlighted interface. If no interface is highlighted, this field is empty or shows the interface previously highlighted.

ForeSwitchApp Gauge Control Panel

This view (Figure 2-6) allows you to change the type of statistics displayed on the Interface icon Gauge labels. To access the Gauge Control Panel, double-click the background of the Interface Options panel, or highlight the Interface Options panel and select **View -> Icon Subviews -> Gauge Control Panel**.

Figure 2-6. Gauge Control Panel for the ForeSwitchApp Model Type



The Gauge Control Panel provides the following selection panels and gauge buttons:

- Gauge Mode selection panel
- Selected Attribute selection panel
- Gauge Type selection panel
- Gauge buttons

Gauge Mode
This selection panel allows you to select the type of information shown on the Gauge label of the Interface icon: Rates, Totals, or Percentages. The Percentages selection displays the percentage of the selected interface compared to the rest of the interfaces.

The color displayed on the Gauge label depends upon the particular mode and statistical attribute selected. Table 2-11 and Table 2-12 list the attributes and their corresponding colors for the Totals mode and Rates mode, respectively.

Table 2-11. Totals Mode: Attributes and Corresponding Color

Selected Attribute	Color
Octets (In/Out)	Green
Cells (In/Out)	Blue
Allocated Bandwidth (In/Out)	Blue
Used Bandwidth (In/Out)	Blue
Discards (Out)	Gray
Errors (In)	Orange

Table 2-12. Rates Mode: Attributes and Corresponding Color

Selected Attribute	Color
Load (In/Out)	Green
Cell (In/Out)	Blue
Discard (Out)	Gray
Error (In)	Orange

Selected Attribute
This selection panel allows you to select the statistical attribute displayed on the Interface icon's Gauge label. The label changes color to reflect the attribute selected.

Gauge Type
This selection panel allows you to select either a numeric or linear display on the Gauge label.

Apply
Applies the current settings to the Gauge label for as long as the view is open.

Keep Settings

Saves the current settings while SpectroGRAPH is running. Settings return to default when you restart SpectroGRAPH.

Reset

Returns the settings to the previously saved values.

Close

Closes the Gauge Control Panel.

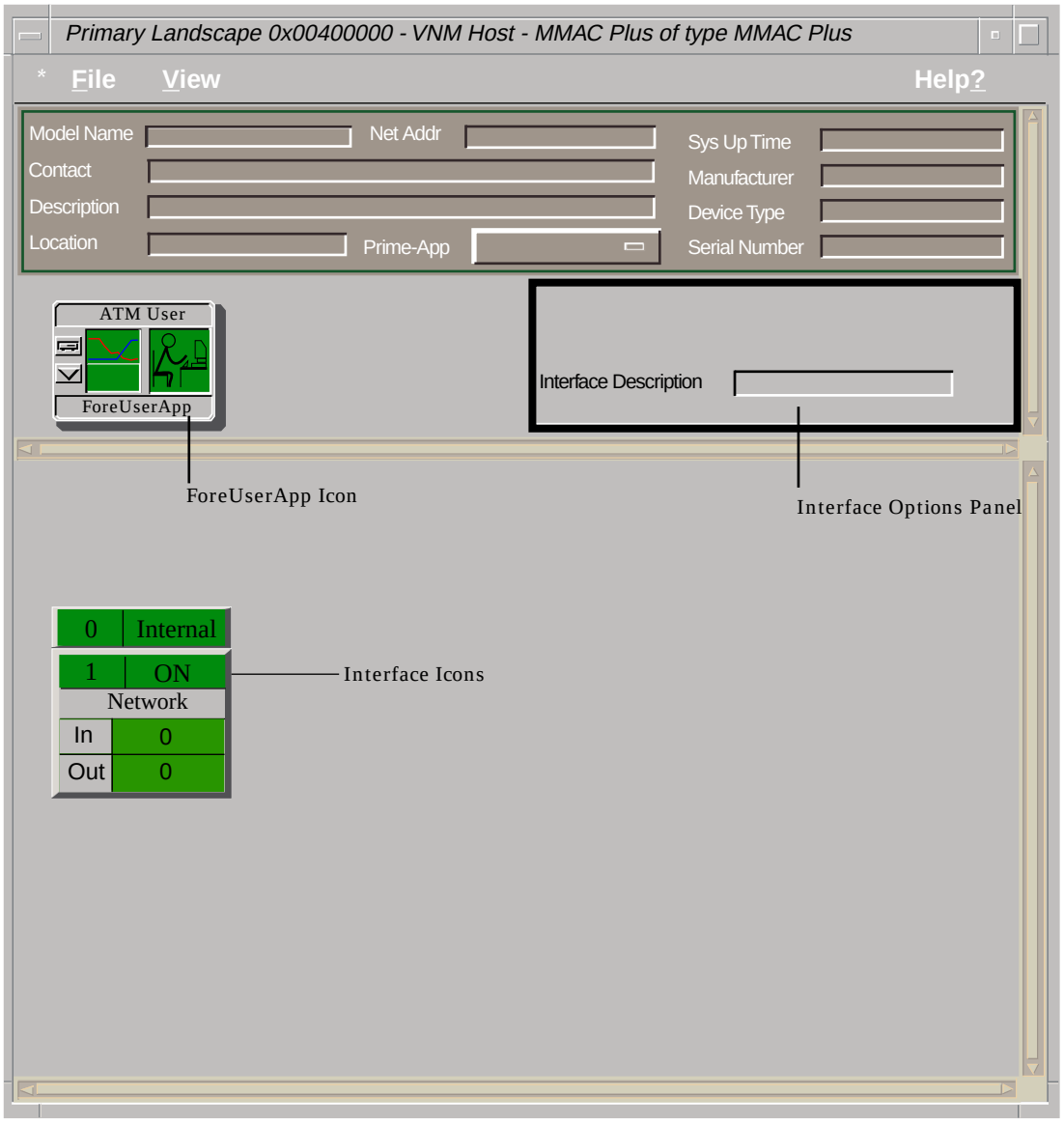
Default

Returns the settings to the SPECTRUM default.

ForeUserApp Interface Device View

This view is accessed from the Dev Top view of the ForeSwitchApp. An example of the Interface Device view for the ForeUserApp is shown in Figure 2-7.

Figure 2-7. ForeUserApp Interface Device View



ForeUserApp Interface Icons

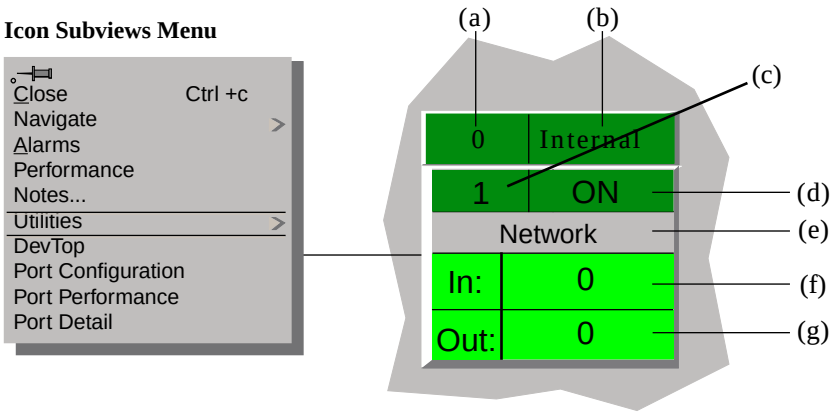
These icons represent the device interfaces on which the workstations are connected. The icons identify the type of interface and provide statistical information. Figure 2-8 shows an example of the ForeUserApp Interface icon, its Icon Subviews menu, and its labels/double-click zones.

NOTES

The callouts (a through g) displayed in the illustration below identify the label and, if available, the view to which it provides double-click zone access. For example, the icon area referred to by callout (d) displays the ATM administrative status and provides double-click access to the ForeUserApp Configuration view.

The menu displayed in the illustration is the Icon Subviews menu for that Interface icon.

Figure 2-8. Interface Icon in the ForeUserApp Interface Device View



a. Ethernet Interface Label/ForeUserApp DevTop View
b. Ethernet Network Information Label
c. ATM Interface Label/ForeUserApp DevTop View
d. ATM Administrative Status Label/ ForeUserApp Configuration View
e. ATM Interface Type Label
f. Inbound Gauge Label/ForeUserApp Port Performance View
g. Outbound Gauge Label/ForeUserApp Port Detail View

ForeUserApp Interface Icon Labels

This section describes the labels on the Interface Icons contained in the ForeUserApp Device view (see Figure 2-8).

Ethernet Interface Label

This label displays the Ethernet interface (port) number. Double-click this label to open the ForeUserApp DevTop view described in the ***Operator's Reference***.

Ethernet Network Information Label

This label displays user-selectable network information. To change this label's display, use the *ForeUserApp Interface Options Panel* described on Page 2-28.

ATM Interface Label

This label displays the ATM interface (port) number. Double-click this label to open the ForeUserApp DevTop view described in the ***Operator's Reference***.

ATM Administrative Status Label

This label displays the status of this interface for the primary application selected (Routing, MIB-II, etc.). The possible states are ON (Green), OFF (Blue), and Testing (Red). Double-click this label to open the *Fore User Application Configuration View* described on Page 3-9.

ATM Interface Type Label

This label displays the type of ATM interface.

Inbound Gauge Label

This label displays the performance statistic determined by the Gauge Control Panel for this interface. The Gauge Control Panel is described on Page 2-28. Double-click this label to open the ForeUserApp *Port Performance View* described on Page 2-25.

Outbound Gauge Label

This label displays the performance statistic determined by the Gauge Control Panel for this interface. The Gauge Control Panel is described on Page 2-28. Double-click this label to open the ForeUserApp Port Detail view described below.

ForeUserApp Interface Icons Subviews

This section describes the views that are accessible from the Icon Subviews menu and from the double-click zones on the Interface icon (see Figure 2-8 on page 2-23). Table 2-13 lists the Interface icon device-specific subviews menu selections. For information on accessing device-specific subviews menus, see Chapter 1, *Introduction*.

Table 2-13. ForeUserApp Interface Icon Subviews Menu

Menu Selection	Description
DevTop	Opens the Device Topology view described in the ***Operator's Reference.***
Port Configuration	Opens the ForeUserApp Configuration view described in Chapter 3, *Configuration Views*.
Port Performance	Opens the ForeUserApp *Port Performance View* described below.
Port Detail	Opens the ForeUserApp *Port Detail View* described on Page 2-26.

Port Performance View

This view includes two subviews: Detail and AAL Detail. Access the ForeUserApp Port Performance view and its subviews as follows:

- Select **View -> Icon Subviews -> Port Performance**.
- Select **Detail** from the Performance view.
- Select **AAL Detail** from the Detail view.

The Port Performance view displays a breakdown of statistics for the port. A mult-attribute line graph provides a general indication of device activity. The attributes displayed are pre-selected and the colors used represent different statistics. Buttons allow you to modify the statistical presentation of the mult-attribute line graph. Table 2-14 lists the color definitions for the port. Refer to the ***Operator's Reference*** for more information on the mult-attribute line graph.

Table 2-14. Performance Statistic Color Definitions

Statistic	Color
In Load	Green
In Cell Rate	Light Blue
Error Rate	Red
Out Load	Yellow
Out Cell Rate	Blue
Discarded	Grey

Port Detail View

This view provides color-coded pie charts displaying statistical information. Three buttons at the bottom of each pie chart select the way in which the data is represented (**Total**, **Delta**, **Accum**). Another button, **Clear**, works in conjunction with the **Accum** button. Statistics are provided on cells and ATM layer data, broken down as listed in Table 2-15 and Table 2-16. Refer to the ***Operator's Reference*** for more information on pie charts.

Table 2-15. Cell Breakdown

Statistics	Description
Received	The number of ATM cells received.
Transmitted	The number of ATM cells transmitted.
Errors	The number of ATM cells received containing errors.
Discards	The number of ATM cells discarded.

Table 2-16. ATM Layer

Statistics	Description
Received	The number of ATM cells received.
Transmitted	The number of ATM cells transmitted.
Out of Range VPIs	The number of ATM cells received with VPI values that were out of range.
Unconnected VPIs	The number of ATM cells received with VPI values that were in range but did not correspond to active connections.

Table 2-16. ATM Layer

Statistics	Description
Out of Range VCIs	The number of ATM cells received with VCI values that were out of range.
Unconnected VCIs	The number of ATM cells received with VCI values that were in range but did not correspond to active connections.

AAL Detail View

This view provides information on cell breakdown for AAL0, AAL4 and AAL5. All breakdowns provide information on cells received, cells transmitted, discarded cells, and total cells. CRC and CS Protocol Errors are reported in AAL4 and AAL5. SAR Protocol Errors are reported in AAL4 only, as listed in Table 2-17, Table 2-18, and Table 2-19.

Table 2-17. AAL0 Cell Breakdown

Statistics	Description
Received	The number of AAL type 0 cells received.
Transmitted	The number of AAL type 0 cells transmitted.
Discards	The number of ATM cells that the adaptation layer discarded in the course of dropping partially reassembled protocol data units (PDUs).

Table 2-18. AAL4 Cell Breakdown

Statistics	Description
Received	The number of AAL type 4 cells received.
Transmitted	The number of AAL type 4 cells transmitted.
CRC Errors	The number of ATM cells received with payload CRC errors.
SAR Port Errors	The number of ATM cells that the adaptation layer rejected due to SAR layer protocol errors.
CS Port Errors	The number of ATM cells that the adaptation layer rejected due to CS layer protocol errors.
Discards	The number of ATM cells that the adaptation layer discarded in the course of dropping partially reassembled PDUs.

Table 2-19. AAL5 Cell Breakdown

Statistics	Description
Received	The number of AAL type 5 cells received.
Transmitted	The number of AAL type 5 cells transmitted.
CRC Errors	The number of CS-PDUs received with protocol data unit CRC errors.
CS Port Errors	The number of CS-PDU's that the adaptation layer rejected due to CS layer protocol errors.
Discards	The number of ATM cells that the adaptation layer discarded in the course of dropping partially reassembled PDUs.

ForeUserApp Interface Options Panel

This area of the Interface Device view (see Figure 2-7 on page 2-22) allows you to modify the presentation of a highlighted icon. Double-click a non-text area of this panel to open the Gauge Control Panel described below. The Interface Options panel provides the following information.

Interface Description
This field describes the interface of the highlighted Interface icon. If no Interface icon is highlighted, this field is empty or shows the interface previously highlighted.

ForeUserApp Gauge Control Panel

This view is the same as the Gauge Control Panel for the ForeSwitchApp model type (see Figure 2-6 on page 2-19).

SW_Link Interface Device View

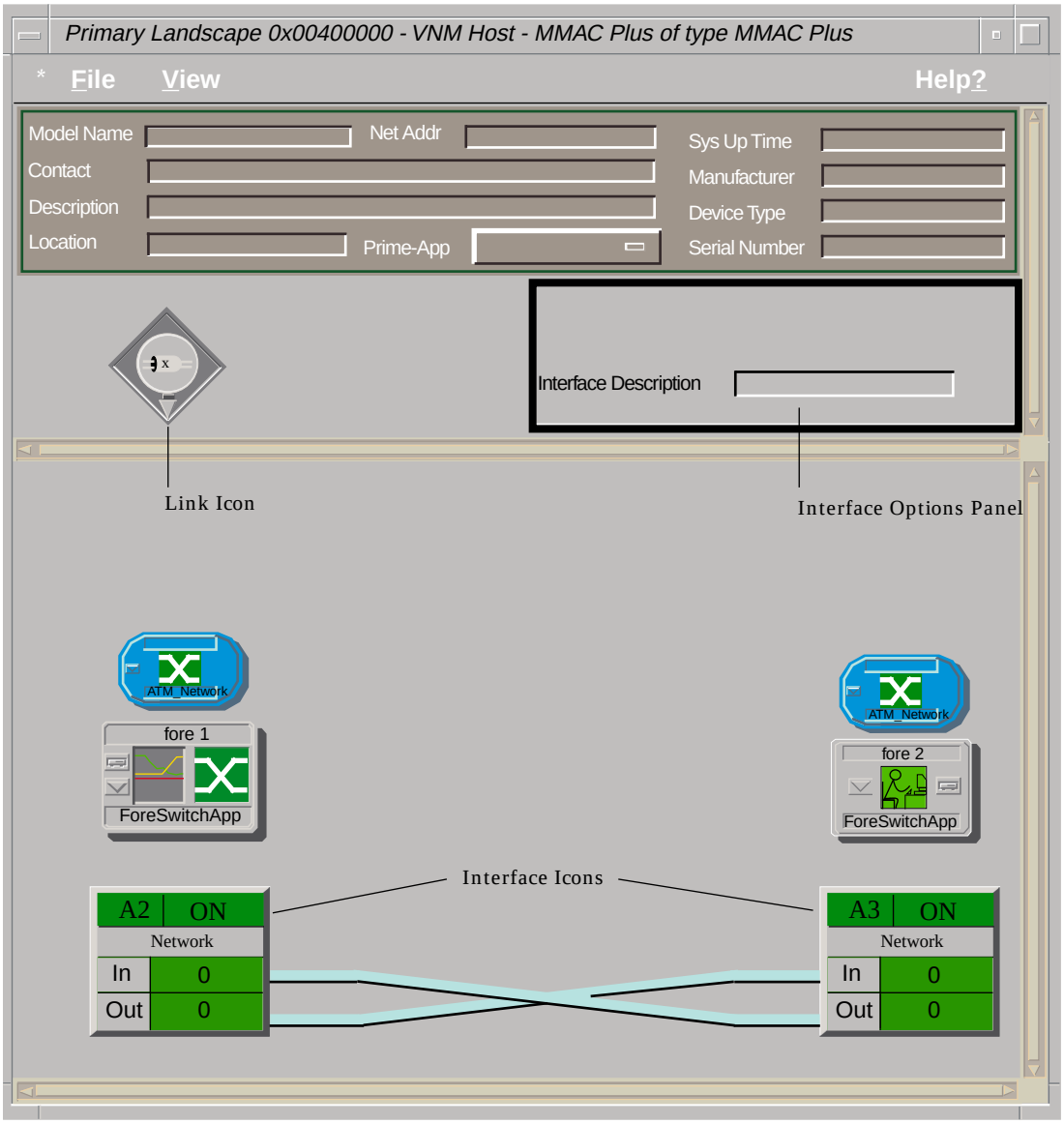
The SW_Link Interface Device view (Figure 2-9) provides a logical representation of the physical connections between ForeSwitchApp model types.

Access the Link view in one of the following ways:

1. Double-click the Link view access arrow on the SW_Link icon.
2. Highlight the SW_Link icon and select **View -> Icon Subviews -> Link View**.

The information available from the Interface icons and Interface Options panel is the same as what is described in this chapter for the ForeSwitchApp model type.

Figure 2-9. SW_Link View



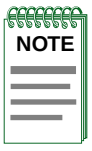
Chapter 3

Configuration Views

What Is in This Chapter

This chapter describes the following configuration views available for the devices:

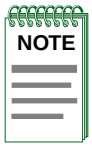
- *Fore ATM Switch Configuration View*, described on Page 3-2, provides board, module, and port level administrative details and operational information.
- *Fore ATM Switch Application Configuration View*, described on Page 3-5, provides port configuration information and allows you to change some IP configuration parameters.
- *Fore User Application Configuration View*, described on Page 3-7, describes the workstation ATM configuration.
- *ForeSwitchApp Port Configuration View*, described on Page 3-8, provides port-specific administration, bandwidth, and path information.
- *ForeUserApp Configuration View*, described on Page 3-9, provides workstation hardware and software configuration information.
- *Fore ATM SONET Application Configuration View*, described on Page 3-10, provides ATM transmission status information.



The Fore ATM SONET Application Configuration view is provided as an example of a typical application configuration view. Your system may not have this application (i.e., SONET OC-3) or it may have other applications (such as DS-1, DS-2, etc.) depending on the network modules installed in your devices. All of these configuration views provide similar information.

In general, you access the device configuration views from the model type icons (ForeSwitchApp, ForeUserApp, etc.) For these views, highlight the model type icon and select **View -> Icon Subviews -> Configuration**.

You access port-specific configuration views from the Interface icons within the Device Interface view. For these views, highlight the Interface icon for the desired interface and select **View -> Icon Subviews -> Configuration**.



You can use the mouse button (right or middle) to access the Configuration views. Click the icon to access the Pop-up Navigator menu and select **Configuration**.

Fore ATM Switch Configuration View

This configuration view displays the information listed below.

1. The Banner (within the green border area) provides descriptive information about the model as described in the ***Operator's Reference***.
2. The four fields below the Banner display the software and hardware version numbers, the signaling control software identification, and the ATM address of the device.
3. The buttons are as follows:

   Traps

   Opens the Fore ATM Switch Application Trap Destination Table view, which displays instructions for setting destinations. For more information on setting traps, refer to the ***SPECTRUM Portable Management Application Tools Guide.***

   Alarms

   Opens the Fore ATM Switch Alarm Table view, which lists alarm, log, and trap action information. For more information, refer to the ***SPECTRUM Portable Management Application Tools Guide.***

   Buffers

   Opens the Buffer Table described below.

4. The configuration view tables (Board, Module, and Interface) are the main focus of the Fore ATM Switch Configuration view. These tables provide board-level, module-level, and port-level administrative details (such as names and addresses) and operational information (such as signaling type, port on/off status, port speed, and datagram size). The configuration view tables also provide double-click access zones and buttons that are

common to all of the tables, including the Buffer Table. These common items are described below, followed by descriptions of each table.

Double Click Access Zones
Each row of data in the configuration tables provides double-click access to a detail view, which provides information specific to the row. Click on any field within a row to access the detail view for the row. The detail view accessed from the Interface Table permits you to change the administrative status of the selected port.

Configuration Table Buttons
Each configuration table contains the buttons described below.

Sort
Sorts the items listed in the columns. Click the column heading of the column you want to sort (which makes **Sort** available) and click **Sort**.

Find
A search feature that is not yet implemented.

Update
Returns the table to its default sort order and updates the display.

Buffer Table

This table provides information concerning the type and size of the ATM switch output buffer. Click **Buffers** in the Fore ATM Switch Configuration view to access this table.

Board
The index of this output buffer's switch board.

Num. Buffers
The number of this output buffer.

Type
The type of this output buffer.

Oper. Status
The operational status of this output buffer.

Buffer Size
The logical size of this output buffer, in cells.

Queue Length
The number of cells in this output buffer.

Overflows
The number of cells dropped because the output buffer was full.

Board Table

This table provides the following identification information for the ATM switch output buffer:

Version
The ATM switch board version number.

Model
The ATM switch board model number.

Serial Number
The ATM switch board serial number.

Number Of Modules
The number of network modules on this ATM switch board.

Module Table

This table provides the following configuration information concerning the ATM switch network module:

Board
The index of this board within the ATM switch.

Number
The number of this network module within the ATM switch.

Name
The type name of this network module within the ATM switch.

Speed
The speed of this network module within the ATM switch.

Number Of Ports
The number of ports on this network module.

UpTime
The time since this network module was created, in hundredths of a second.

Interface Table

This table provides the following port status information for the ATM switch:

Index
The value identifying the port.

Description
The textural description of the interface.

Admin Status
The desired state of this port (ON, OFF, or TEST).

Oper Status
The current operational state of this port (ON, OFF, or TEST).

MAC Address
The MAC address of the port.

Speed
The speed of this port within the ATM switch.

Type
The type of this port.

Mtu (Message Transfer Unit)
The size of the largest datagram that can be sent or received on the interface, specified in octets. For interfaces that are red transmitting network datagrams, this is the size of the largest network datagram that can be sent on the interface.

Fore ATM Switch Application Configuration View

This view provides board-specific configuration information and allows you to change some of the IP configuration parameters. Each row of data in the view provides double-click access to a Port view that provides information specific to the row and permits you to change the loopback and administrative status of the selected module. Click on any field contained within a row to access the Port view.

The Fore ATM Switch Application Configuration view provides three fields and a Port Table as follows:

Num. of Ports
The number of ports available on the device.

Policing Action
The action the device will take in case of a bandwidth violation on this channel.

CDV (Cell Delay Variation)
The time window in which a cell may be received on a channel and be accepted.

Port Table

This table provides the following port information for the devices:

Board
The index of this port's switch board.

Module
The network module of this port.

Port
The number of this port within its network module.

Version
The version number of this port's network module.

Model
The model number of this port's network module.

Oper. Status
The operational status of this port.

Buffer Size
The logical size of this port's output buffer, in cells.

Queue Length
The number of cells in this port's output buffer.

Overflows
The number of cells dropped because the output buffer was full.

Errors
The number of cells containing errors.

Carrier
The presence or absence of a carrier at this port.

Global Index
The global index of this port within the ATM switch as a whole.

Name
The name of the port indicating the board network module and port identifiers.

Admin Status
The administrative state of the physical layer of this port. When a port is configured "Up", the physical layer is configured to process all physical layer events including the transmission and reception of data (cells). When a port is configured "Down", the physical layer is shut down and ignores all physical layer events.

Fore User Application Configuration View

This view includes the following fields that describe the workstation ATM configuration:

Hardware Version
The version of the ATM adaptor hardware. The number is encoded into six hexadecimal digits.

Hardware Speed
The speed of the ATM adaptor hardware.

Firmware Version
The version of the ATM adaptor firmware. The number is encoded into six hexadecimal digits.

Software Version
The version of the ATM adaptor software. The number is encoded into six hexadecimal digits.

Uptime
The length of time since the workstation connection was created, in hundredths of a second.

Serial Number
The serial number of the ATM adaptor hardware.

Adapter Type
The workstation adapter type number

Rec Carrier
The presence or absence of a carrier on the link.

Port Number
The number of the port selected.

Oper Status
The current operational state of the adaptor.

ATM Address
The address of this ATM adaptor.

Physical Layer
The physical layer of the adaptor.

ForeSwitchApp Port Configuration View

This view provides the following port specific information:

Port Number
Identifies the port.

Port Uptime
The length of time this port has been in its current state.

Port Hw Board
The hardware board number of this port.

Port Hw Module
The hardware module number of this port.

Port Hw Number
The hardware port number of this port.

Remote ATM Address
The ATM address of the entity connected to this port.

Remote IP Address
The IP address of the entity connected to this port.

ILMI Remote Address
The Integrated Layer Management Interface (ILMI) address of the entity connected to this port. Default is 255.255.255.255.

Administrative Status
The desired state of this port. The dynamic state indicates that a link monitoring protocol is used to determine the operational status of the port.

Operational Status
The current operational state of this port

Bandwidth In Max/Out Max
The maximum incoming/outgoing bandwidth of this port, in cells per second.

Bandwidth In Allocated/Out Allocated
The allocated incoming/outgoing bandwidth of this port, in cells per second.

Bandwidth In Used/Out Used
The incoming/outgoing bandwidth being used on this port, in cells per second.

Paths In Max/Out Max
The maximum number of incoming/outgoing virtual paths supported by this port.

Paths In Number/Out Number
The number of incoming/outgoing virtual paths being used on this port.

The Port Configuration view also contains five buttons that access the Path Table views described for ForeSwitchApp in Chapter 5, *Application Views*.

ForeUserApp Configuration View

This view provides the following port specific information:

Hardware Version
The version of the ATM adaptor hardware. The number is encoded into six hexadecimal digits.

Hardware Speed
The speed of the ATM adaptor hardware.

Firmware Version
The version of the ATM adaptor firmware. The number is encoded into six hexadecimal digits.

Software Version
The version of the ATM adaptor software. The number is encoded into six hexadecimal digits.

Uptime
The length of time that the port has been in its current state.

Serial Number
The serial number of the ATM adaptor hardware.

Adaptor Type
The hardware type of the adaptor.

Rec Carrier
The presence or absence of a carrier on the link.

Port Number
The number of the port selected.

Oper Status
The current operational state of the adaptor.

ATM Address
The address of this ATM adaptor.

Physical Layer
The physical layer of the adaptor.

Fore ATM SONET Application Configuration View

The Fore ATM SONET Application Configuration view is provided as an example of a typical application configuration view. Your system may not have this application (i.e., SONET OC-3) or it may have other applications (such as DS-1, DS-2, etc.) depending on the network modules installed in your devices. All of these configuration views provide similar information.

In general, the application configuration view provides port-specific configuration information and allows you to change some of the transmission parameters. Each row of data in the view provides double-click access to a detail view that provides information specific to the row. Click on any field contained within a row to access the detail view for the row.

The detail view accessed from the Fore ATM SONET Application Configuration view permits you to control transmit and receive descrambling and change the framing operator and loopback configuration of the selected port.

The Fore ATM SONET Application Configuration view provides the following fields:

Board
The index of this port's switch board.

Module
The network module of this port.

Port
The number of the port within the network module.

Line Type
The line type for the interface. The possible values are Other, Single mode short range, Single mode medium range, Multimode, UTP, or Coax. The default is Multimode.

Line Coding
The line coding for the interface. The possible values are Other, B3ZS, CMI, or NRZ. The default is NRZ.

Framing Default
The default value of the framing standard used by the port. The possible values are SONET or SDH.

Framing Oper
The operational value of the framing standard used by the port. The possible values are 1 (atm SONET) or 2 (atm SDH).

Path Width
The type of the SONET path. The possible values are sts1, sts3c, sts9c, sts12c, sts24c, or sts48c. The default is sts3c.

Loopback
The current loopback status of the SONET interface. The possible status entries are as follows:

None - the interface is not in a loopback state (default value)

Line - the receive data and clock are connected to the transmit data and clock

Diag - the transmit data stream and clock are looped back to the receiver

Other - the interface is in a loopback that is not defined.

Tx Clock Source
The source of the transmit clock. The possible values are Local or Rx. The default is Local.

Rx Scrambling
Indicates whether the information is being descrambled on receiving. The possible values are Descrambling or No Descrambling. The default is Descrambling.

Tx Scrambling
Indicates whether the information is being descrambled before transmitting. The possible values are Scrambling or No Scrambling. The default is Scrambling.

Section Stat
The section status of the interface. The possible values are 1 (no defect), 2 (loss of signal detected), or 4 (loss of frame detected). The default is 1.

Line Status
The line status of the interface. The possible values are 1 (no defect), 2 (line alarm indication signal detected), or 4 (line far end receive failure detected). The default is 1.

Path Status
The path status of the interface. The possible values are 1 (no defect), 2 (path loss of pointer detected), 4 (path alarm indication signal detected), or 8 (path yellow alarm detected). The default is 1.

Chapter 4

Event and Alarm Messages

What Is in This Chapter

This chapter lists the types of events and alarms generated by the devices and provides any probable cause messages corresponding to these alarms.

Device Events and Alarms

Table 4-1 lists the SPECTRUM database directory paths (in bold) and the messages displayed for the Event Log and Alarm Manager when applicable.

Table 4-1. Device Events and Alarms

Message in the Event Log	Alarm Manager Probable Cause Message
CsEvFormat/Event00010306 {d “%w- %d %m-, %Y - %T”} - A(n) {t} device, named {m}, has been cold started. (event [{e}])	**No probable cause message**
CsEvFormat/Event00010307 {d “%w- %d %m-, %Y - %T”} - A(n) {t} device, named {m} has been warm started, (event [{e}])	**No probable cause message**

Table 4-1. Device Events and Alarms (Continued)

Message in the Event Log	Alarm Manager Probable Cause Message
CsEvFormat/Event00010308 {d "%w- %d %m-, %Y - %T"} - A(n) {t} device, named {m}, has detected a communication Link Down. (event [{e}])	**CsPCause/Prob00010308** Communication link is down.
CsEvFormat/Event00010309 {d "%w- %d %m-, %Y - %T"} - A(n) {t} device, named {m}, has detected a communication Link Up. (event [{e}])	**No probable cause message**
CsEvFormat/Event0001030a {d "%w- %d %m-, %Y - %T"} - A(n) {t} device, named {m}, has detected an Authentication Failure. (event [{e}])	**CsPCause/Prob0001030a** Authorization failure. Other user is trying to connect to device with an invalid community string.
CsEvFormat/Event0001030b {d "%w- %d %m-, %Y - %T"} - A(n) {t} device, named {m}, has detected an EGP Neighbor Loss. EGP Neighbor IP address is {0 1}. (event [{e}])	**CsPCause/Prob0001030b** Lost contact with EGP neighbor.
CsEvFormat/Event000d01a0 {d "%w- %d %m-, %Y - %T"} - A Port Interface Module has been inserted into port {I 3} of interface {I 1} on {m} ({t}). (event [{e}]).	**CsPCause/Prob000d01a0** A Port Interface Module has been physically inserted.
CsEvFormat/Event000d01a1 {d "%w- %d %m-, %Y - %T"} - A Port Interface Module has been removed from port {I 3} of interface {I 1} on {m} ({t}). (event [{e}])	**CsPCause/Prob000d01a1** A Port Interface Module has been physically removed.
CsEvFormat/Event000d01a2 {d "%w- %d %m-, %Y - %T"} - Network configuration change reported by {m} ({t}). Device linked to port {I 3} on interface {I 1}. (event [{e}])	**CsPCause/Prob000d01a2** A device supporting link integrity, fiber optic or twisted pair, has made a valid connection (link) to this port.

Table 4-1. Device Events and Alarms (Continued)

Message in the Event Log	Alarm Manager Probable Cause Message
CsEvFormat/Event000d01a3 {d "%w- %d %m-, %Y - %T"} - Port {I 3} on interface {I 1} of {m} ({t}), has unsegmented. (event [{e}]).	**CsPCause/Prob000d01a3** A device previously linked with this port has been removed, powered down, or the cable segment has a fault.
CsEvFormat/Event000d0351 {d "%w- %d %m-, %Y - %T"} - Front panel redundant port {I 1} has been activated by device {m} of type {t}. (event [{e}])	**CsPCause/Prob000d035**1 A new port has been activated for the front panel redundant circuit. This does NOT indicate this port is usable, but is being tested.
CsEvFormat/Event000d0001 {d "%w- %d %m-, %Y - %T"} - {m} of type {t} has reported a root change. (event [{e}])	**CsPCause/Prob000d0001** This bridge has become the new root of the Spanning Tree.
CsEvFormat/Event000d0002 {d "%w- %d %m-, %Y - %T"} - Bridge {m} of type (t) has reported a network topology change (event [{e}]).	**CsPCause/Prob000d0002** A port has transitioned from the Learning state to the Forwarding state, or from the Forwarding state to the Blocking state.
CsEvFormat/Event00830000 {d "%w- %d %m-, %Y - %T"} - DLM LostContact trap for Destination Address {0 1}, Owner Address {0 2} from {t} device, named {m}. (event [{e}]).	**No probable cause message**
CsEvFormat/Event00830001 {d "%w- %d %m-, %Y - %T"} - DLM Threshold Trap for Destination Address {0 1}, Owner {0 2}, OID sequence {I 3}, OID Object {0 4} from {t} device, named {m}. (event [{e}]).	**No probable cause message**
CsEvFormat/Event00830002 {d "%w- %d %m-, %Y - %T"} - DLM ReestabContact Trap for Destination Address {0 1}, Owner Address {0 2} from {t} device, named {m}. (event [{e}])}.	**No probable cause message**

Chapter 5

Application Views

What Is in This Chapter

This chapter describes the Application views and the device-specific applications to which they provide access. The applications display detailed configuration and operational status information.

This chapter describes the following Application views, applications, and application model types (in parentheses):

- ForeRunner Application View
  - Routing (GenRtrApp)
  - IP Routing (IP2RtrApp)
  - Switching (ForeSwitchApp)
  - SONET (Fore_SONET_App)
- Workstation Application View
  - Routing (GenRtrApp)
  - IP Routing (IP2RtrApp)
  - Fore User Agent (ForeUserAgent)
  - ATM User (ForeUserApp)

Common Applications Not Covered Here

The devices support the following common applications described in the ***Application View Reference.***

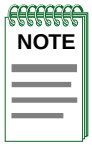
- MIB-II (SNMP2_Agent)
  - ICMP (ICMP_App)
  - System (System2_App)
  - TCP (TCP2_App)
  - UDP (UDP2_App)

The Application Views

Refer to Chapter 1, *Introduction*, for information on accessing SPECTRUM views from the Device icon and accessing device-specific subviews.

The Application views can be displayed in two modes. The Icon mode displays the applications as icons. The List mode displays the applications as text labels. To change the Application view display mode, in the Application view select **View -> Mode -> List** or **Icon**.

The Application view modes are illustrated on the following pages. Figure 5-1 shows an example of the ForeRunner Application view in the Icon mode. Figure 5-2 shows an example of the Workstation Application view in the List mode.



Notice in the illustrations that the Routing (GenRtrApp) and IP Routing (IP2RtrApp) applications are accessible from both the ForeRunner and Workstation Application views. This may not be the case with your system, depending upon your network setup.

Figure 5-1. ForeRunner Application View in the Icon Mode

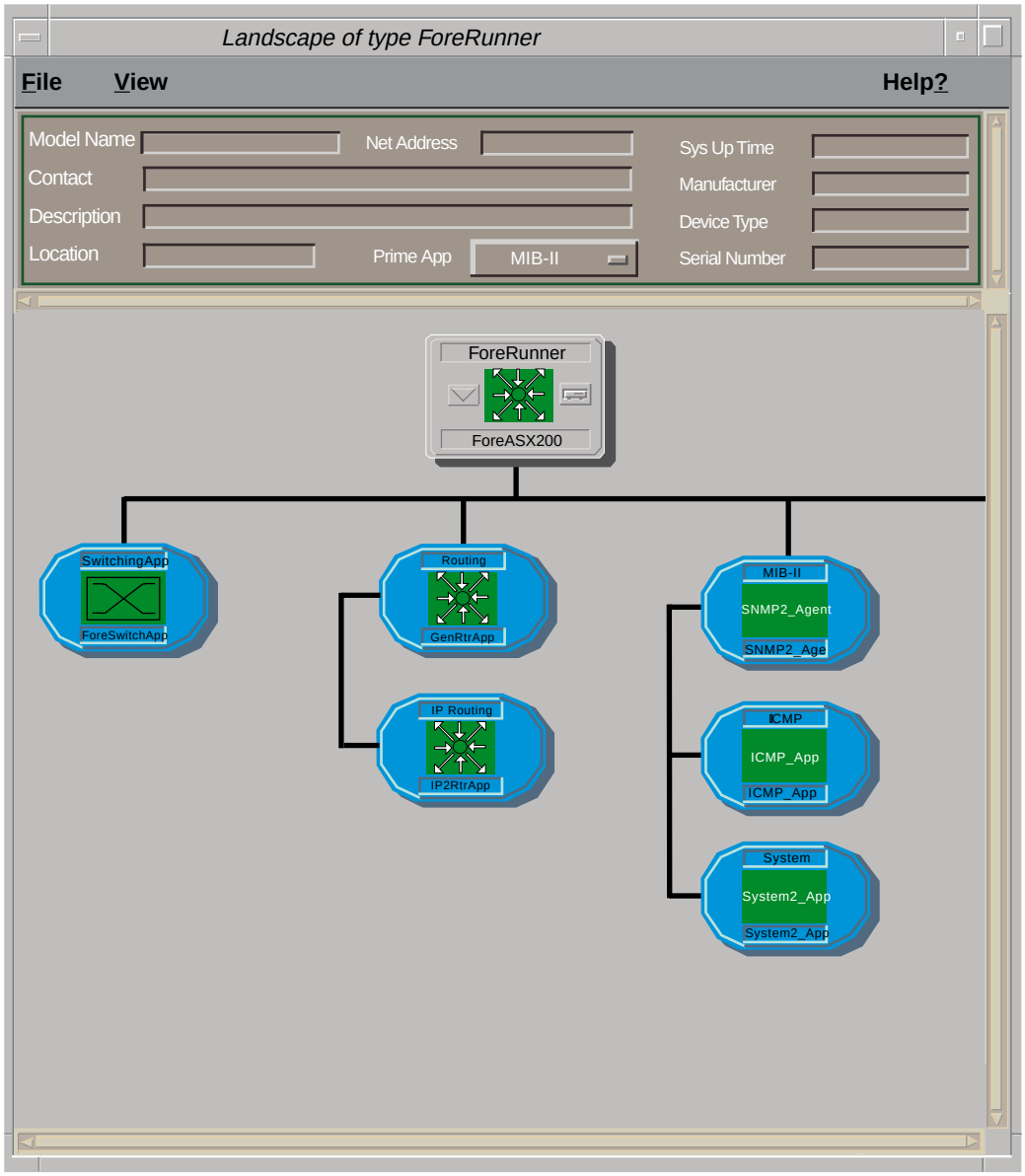
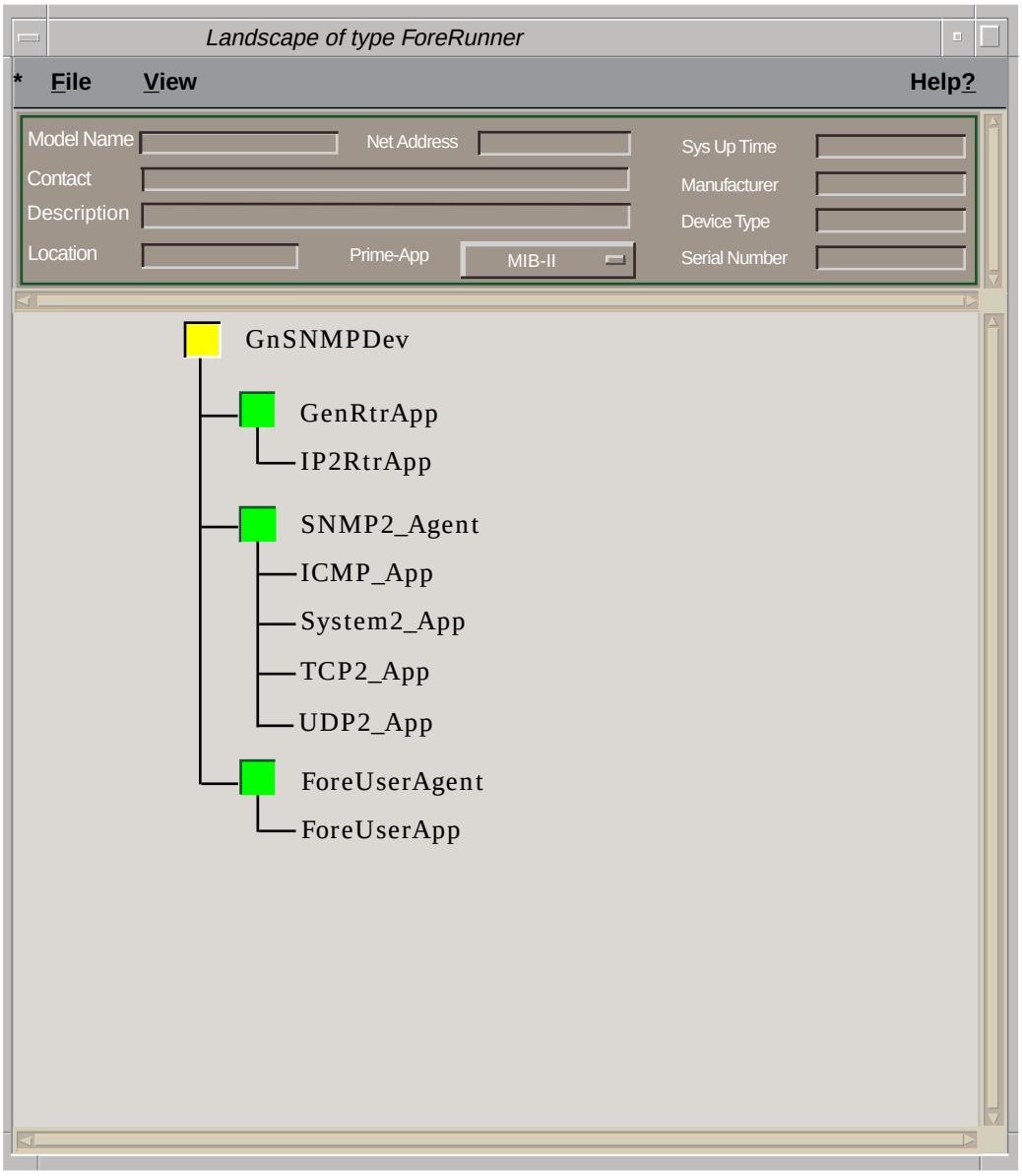


Figure 5-2. Workstation Application View in the List Mode



Routing (GenRtrApp) Application

Table 5-1 describes the Icon Subviews menu selections for this application. See Chapter 1, *Introduction*, for information on accessing subviews menus.

Table 5-1. Routing Application Icon Subviews Menu Selections

Menu Selection	Description
Model Information	Opens the Model Information view described in the ***Operator's Reference***.
Protocol Comparison	Opens the Protocol Comparison view summarized below.

Protocol Comparison View

This view contains three color-coded pie charts that display statistics for the application. Each pie chart shows a breakdown of IP Routing traffic from each routing application being monitored by GenRtrApp through the "Provides" relation.

Three buttons at the bottom of each pie chart select the way in which the data is represented (**Total**, **Delta**, **Accum**).

Statistics are provided about Frames Forwarded, Frames Delivered, and Frames Transmitted

Refer to the ***Operator's Reference*** for more information on the pie charts.

IP Routing (IP2RtrApp) Application

Table 5-2 describes the Icon Subviews menu selections for this application. See Chapter 1, *Introduction*, for information on accessing subviews menus.

Table 5-2. IP Routing Application Icon Subviews Menu Selections

Menu Selection	Description
Detail	Opens the *Detail View* summarized on Page 5-6.
IP Configuration	Opens the *IP Configuration View* described on Page 5-7.
IP Routing	Opens the *IP Routing View* described on Page 5-8.
IP Address Table	Opens the *IP Address Table View* described on Page 5-9.
IP Fragmentation	Opens the *IP Fragmentation View* described on Page 5-9.
IP Reassembly	Opens the *IP Reassembly View* summarized on Page 5-10.
Model Information	Opens the Model Information view described in the ***Operator's Reference***.

Detail View

This view provides color-coded pie charts that display IP routing statistics. Table 5-3, Table 5-4, and Table 5-5 define the statistics provided by the charts. Three buttons at the bottom of each chart select the way in which the data is represented (**Total**, **Delta**, **Accum**).

Refer to the ***Operator's Reference*** for more information on pie charts.

Table 5-3. IP Routing Detail Packet Breakdown

Statistic	Definition
Delivered	IP Routing packets delivered to a higher level protocol.
Forward	IP Routing packets forwarded.
Transmitted	IP Routing packets transmitted.
Errors	IP Routing packets received containing errors.
Discards	IP Routing packets discarded.

Table 5-4. IP Routing Detail Error Breakdown

Statistic	Definition
Header	IP Routing packets received containing packet header errors (time-to-live exceeded, version number mismatch, bad checksum, etc.).
Address	IP Routing packets received and discarded due to invalid addresses in the header's destination field.

Table 5-5. IP Routing Detail Discard Breakdown

Statistic	Definition
No Routes	The number of IP Routing packets discarded because the router did not know where to forward them.
Unknown	Unknown IP Routing packet types received.
In Discards	Received IP Routing packets discarded, even though no errors were encountered to prevent their continued processing. Such packets may have been discarded to increase buffer space.
Out Discards	Transmitted IP Routing packets discarded, even though no errors were encountered to prevent their continued processing. Such packets may have been discarded to increase buffer space.
Reassembly	IP Routing packet fragments that experienced reassembly failures detected by the IP reassembly algorithm due to time out, errors, etc.
Fragmentation	IP Routing packets that could not be fragmented by the router because their “Don't Fragment” flag was set.

IP Configuration View

This view provides configuration information for the router's IP process. It also allows you to change some of the IP configuration parameters. The IP Configuration view provides the following information:

Time to Live
The default Time to Live value, in seconds, as found in the IP header of datagrams, given that a Time to Live value was not provided by the transport layer protocol.

Re-Assembles Time-out
The maximum number of seconds IP datagram fragments are held by the router while awaiting reassembly.

IP Forwarding
A read-only indicator displaying whether the router is operating as a gateway or a host.

IP Routing View

This view provides a table that describes each transmission route known by the router. Double-clicking any table entry opens a route-specific IP Routing table. The IP Routing view and the corresponding entry-specific tables provide the following information:

Destination Addr
The destination IP address of the route. An address 0.0.0.0 is a default route.

Next Hop Addr
The IP address of the next hop on the route.

Interface
The local interface through which the next hop on the route should be reached.

Route Age
The number of seconds since the route was last updated or determined to be correct.

Primary Metric
The primary routing metric for the route. A metric is the value resulting from algorithmic computations of a variable such as path length, bandwidth, or load. If the primary metric is not used, set the value to -1.

Alt Metric
The alternative (secondary) routing metric for the route. If this metric is not used, set the value to -1. This field is only available from the route-specific IP Routing table.

Route Mask
The network mask (either a Class A, B, or C network).

Metric 5
An alternate routing metric for a router, which is set to a value of -1 if not used.

Route Info
Information regarding the routing protocol applicable to the route.

Routing Type
The type of routing used by the device. Possible types are Direct, Indirect, Invalid, and Other. Direct routing follows a point-to-point hierarchical path, or tree structure, in searching for the destination host. Indirect routing transports packets through other networks (also termed group-to-group).

IP Address Table View

This view provides a table that describes each interface on the router. Double-clicking any table entry opens an interface-specific IP Address table. The IP Address Table view and its corresponding entry-specific tables provide the following information:

IP Address
The IP address of the interface.

Interface
The number of the interface.

Net Mask Addr
The subnet mask associated with the IP address of the interface.

Broadcast Addr
The value of the least significant bit in the IP broadcast address used for sending datagrams on the interface.

Largest IP Datagram
The size of the largest IP datagram that can be re-assembled from incoming IP fragmented datagrams received on the interface.

IP Fragmentation View

This view contains a color-coded pie chart displaying a breakdown of the IP fragmentation statistics. Three buttons at the bottom of the pie chart select the way in which the data is represented (**Total**, **Delta**, **Accum**). Table 5-6 provides definitions for the statistics presented by the pie chart.

Refer to the ***Operator's Reference*** for more information on pie charts.

Table 5-6. IP Fragmentation Breakdown

Statistic	Definition
Creates	The number of IP datagram fragments that have been generated as a result of fragmentation.
OKs	The number of IP datagram fragments successfully reassembled.
Fails	The number of IP datagram fragment reassembly failures detected by the IP reassembly algorithm due to time out, errors, etc.

IP Reassembly View

The view contains a color-coded pie chart displaying a breakdown of IP reassembly statistics. Three buttons at the bottom of the pie chart select the way in which the data is represented (**Total**, **Delta**, **Accum**). Table 5-7 provides definitions for the statistics presented by the pie chart.

Refer to the ***Operator's Reference*** for more information on the pie charts.

Table 5-7. IP Reassembly Breakdown

Statistic	Definition
Requests	The number of IP reassembly requests.
OKs	The number of IP datagram fragments successfully reassembled.
Fails	The number of IP datagram fragments reassembly failures detected by the IP reassembly algorithm due to time out, errors, etc.

IP Reassembly Time-out

The maximum number of seconds IP datagram fragments are held by the router while awaiting reassembly.

Switching (ForeSwitchApp) Application

Table 5-8 describes the Icon Subviews menu selections for this application. See Chapter 1, *Introduction*, for information on accessing device-specific subviews menus.

Table 5-8. Switching Application Icon Subviews Menu Selections

Menu Selection	Description
Configuration	Opens the Switching Application Configuration view described in Chapter 3, *Configuration Views*.
Model Information	Opens the Model Information view described in the ***Operator's Reference***.
Path	Opens the *Path Tables* described on Page 5-12.
Channels	Opens the *Channels Tables* described on Page 5-15.
Topology	Opens the *Topology Tables* described on Page 5-16.
Signaling	Opens the *Signaling Tables* described on Page 5-20.
Interfaces	Accesses the Performance view described in the ***Operator's Reference*** and in Chapter 3, *Configuration Views*.
ForeView	Accesses the separately purchasable ForeView Application described in Chapter 6, *ForeView*.

Some of the fields in the Path, Channels, Topology, and Signaling Tables views are used to set connection information. Changes to these tables affect the format of some of the fields in the tables listed below.

- Path - Originating, Through, and Terminating Tables
- Channels - In and Through Tables
- Topology - NSAP Admin Tables
- Signaling - SPANS Path and Q2931 Admin Tables

In order to change the fields in these tables, the Community Name field in the Communication Information panel of the Model Information view must be set to "private" or whatever the community name is for read/write privileges.

To create, change, or delete rows in the tables listed in the above paragraph, you must first select the row as follows:

1. Select the desired table from the Icon Subviews menu.
2. Set the path information for the row you wish to create, change, or delete.

3. Click **Enter** and then **OK**.

To create or change the row after selecting it, do the following:

1. Click **Create**.
2. Change the applicable fields in the change view.
3. Click the right mouse button and select **OK.**
4. Click **Validate Row** and click the right mouse button to return to the table view and see the change.

To remove the row after selecting it, do the following:

1. Click **Remove**.
2. Click **Update**. The row will be removed from the table view.

Path Tables

These tables contain Path information about the virtual paths originating from, terminating at, or passing through the device. The following tables are available:

- Originating Path Table
- Terminating Path Table
- Through Path Table

Originating Path Table

This table shows originating path status information and allows you to create and remove paths. Follow the procedure shown at the bottom of the table to create and remove paths. This table contains the following fields:

Port
The input port of this path.

VPI (Virtual Path Identifier)
The input VPI of this path.

Status
The status of this path entry.

Chan. Max
The maximum number of virtual channels that can be allocated on this path.

Chan. Alloc.
The number of virtual channels currently allocated on this path.

Band. Max
The maximum bandwidth of this path, in cells per second.

Band. Alloc.
The allocated bandwidth of this path, in cells per second.

Band. Used
The bandwidth used on this path, in cells per second.

Uptime
The time since this path was created.

Cells
The number of cells transferred over this path.

Protocol
The signaling protocol that created this path.

Terminating Path Table

This table shows terminating path status information and allows you to create and remove paths. Follow the procedure shown at the bottom of the table to create and remove paths. This table contains the following fields:

Port
The output port of this path.

VPI
The output VPI of this path.

Status
The status of this path entry.

VCs (Virtual Channels)
The VCs of this path.

Chan. Max
The maximum number of virtual channels that can be allocated on this path.

Chan. Alloc.
The number of channels currently allocated on this path.

Band. Max
The maximum bandwidth of this path, in cells per second.

Band. Alloc.
The allocated bandwidth of this path, in cells per second.

Band. Used
The bandwidth used on this path, in cells per second.

Uptime
The time since this path was created, in hundredths of a second.

Cells
The number of cells transferred over this path.

Protocol
The signaling protocol that created this path.

Through Path Table

This table shows through path status information and allows you to create and remove paths. Follow the procedure shown at the bottom of the table to create and remove paths.This table contains the following fields:

In Port
The input port of this path.

In VPI
The input VPI of this path.

Out Port
The output port of this path.

Out VPI
The output VPI of this path.

Status
The status of this path entry.

Band. Max
The maximum bandwidth of this path, in cells per second.

Band. Alloc.
The allocated bandwidth of this path, in cells per second.

Cells
The number of cells transferred over this path.

Uptime
The time since this path was created, in hundredths of a second.

Protocol
The signaling protocol that created this path.

Channels Tables

These tables contain channel information about the virtual paths coming in or passing through the device. The following tables are available:

- In Channels Table
- Through Channels Table

Input Channels Table

This table shows input path status information and allows you to create and remove paths. Follow the procedure shown at the bottom of the table to create and remove paths.This table contains the following fields:

Port
The input of this channel.

VPI
The input VPI of this channel.

VCI (Virtual Channel Identifier)
The input VCI of this channel.

Status
The status of this channel entry.

Ports Routed
The number of output ports to which this channel is routed.

Band. Alloc.
The allocated bandwidth on this channel, in cells per second.

Band. Used
The bandwidth used on this channel, in cells per second.

Uptime
The time since this channel was created, in hundredths of a second.

Protocol
The signaling protocol that created this path.

Cells
The number of cells transferred over this channel.

Rejected Cells
The number of cells discarded on this channel.

CDV
The Cell Delay Variation Tolerance specified in microseconds.

Policing Action
The action the device will take when there is a bandwidth violation on this channel.

Output Channels Table

This table shows output path status information and allows you to create and remove paths. Follow the procedure shown at the bottom of the table to create and remove paths.This table contains the following fields:

In Port
The input port of this path.

In VPI
The input VPI of this path.

In VCI
The input VCI of this channel.

Out Port
The output port of this path.

Out VPI
The output VPI of this path.

Out VCI
The output VCI of this channel.

Status
The status of this path entry.

Protocol
The signaling protocol that created this path.

Topology Tables

These tables contain information about the links, switch cluster, switch board links/topology, NSAP prefix, NSAP administration, and NSAP topology for the devices. The following tables are available:

- Links Table
- Switch Cluster Table
- Switch Board Links/Topology Table
- NSAP Network Prefix Table
- NSAP Admin Table
- NSAP Topology Table

Links Table

This table contains the following fields:

Number of Links
The current number of Links known by this ATM switch.

Source
The ATM address of the source switch of this link.

Destination
The ATM address of the destination switch of this link.

Capacity
The free capacity of this link, in kilobits per second.

Age
The age of this link information. The actual value has meaning only for comparing different links.

Switch Cluster Table

This table contains the following fields:

Index
The index number of the switch board within the ATM switch cluster.

Max Paths
The maximum number of input VPIs on this switch board.

Max Channel
The maximum number of input VCIs on this switch board.

ATM Address
The address of this ATM switch board.

Uptime
The length of time this switch board has been up, in hundredths of a second.

CDV (Cell Delay Variation)
The switch board CDV, specified in microseconds. This indicates the time window in which a cell may be received on a connection and be accepted.

Policing Act
The action the switch board will take in case of a bandwidth violation.

Switch Board Links/Topology Table

This table contains the following fields:

Index
The index of this switch board within the ATM switch cluster.

Source
The ATM address of the source switch of this link.

Destination
The ATM address of the destination switch of this link.

Capacity
The free capacity of this link, in kilobits per second.

Age
The age of this link information. The actual value has meaning only for comparing different links.

Inter-Switch Links
The number of inter-switch links for this ATM switch.

NSAP Network Prefix Table

This table contains the following fields:

Port
The port of this signaling path, which is the same as the NSAP port.

VPI
The VPI of this signaling path statistics entry.

NSAP Prefix
The network prefix used for ATM addresses that is in effect on the user side of the ATM UNI (User Network Interface) port.

Status
The status of this Network Prefix entry. Setting this field to “invalid” causes this network to disappear.

NSAP Admin Table

This table contains the following fields:

Address
Identifies the NSAP.

Mask
Identifies the mask that is used for this NSAP.

Port
Identifies the port that this NSAP can be reached on.

VPI
Identifies the path that this NSAP can be reached on.

State
Identifies the state of this NSAP: (1) in use, (2) idle.

Status
The status of this NSAP address. Setting this object to invalid causes this NSAP address to disappear.

NSAP Topology Table

This table contains the following fields:

Board
The switch board within the ATM switch cluster.

Source
Identifies the source NSAP address of this link.

Source Mask
Identifies the mask that is used for the link source NSAP address.

Source Port
Identifies the port that is used for the link source NSAP address.

Destination
Identifies the destination NSAP address of this link.

Dest. Mask
Identifies the mask that is used for the link destination NSAP address.

Dest. Port
Identifies the port that is used for the link destination NSAP address.

Cost
The routing metric for this link.

CBR (Constant Bit Rate) Capacity
The available capacity for additional CBR connections, in kilobits per second.

CBR FIFO (First In First Out)
The size of the FIFO queue that is used for transmitting CBR traffic, in cells.

VBR (Variable Bit Rate) Capacity
The available capacity for additional VBR connections, in kilobits per second.

VBR FIFO
The size of the FIFO queue that is used for transmitting VBR traffic, in cells.

Link Source
The source of this route information.

Capabilities
The bitmap indication of the capabilities of this link.

UBR (Unspecified Bit Rate) VCs
The number of active UBR VCs over this link.

Freshness
The freshness (or staleness) of this NSAP link.

Signaling Tables

The following signaling information tables are provided:

- SPANS Path Table
- SPANS Status Table
- SPANS Smart PVCs Source Table
- SPANS Smart PVCs Destination Table
- Q2931 Admin Table
- Q2931 Statistics Table

SPANS Path Table

This table contains the following fields:

Port
The port of this signaling path.

VPI
The VPI of this signaling path.

VCI
The VCI of the signaling channel within the signaling path.

Connectionless VCI
The VCI of the connectionless channel within the signaling path.

Admin Status
The desired state of this signaling channel.

Operational
The current operational state of this signaling channel.

Status
The status of this signaling path entry.

AAL (ATM Adaptation Layer) Type
The AAL type that is used by this Q2931 signaling path.

CDV (Cell Delay Variation)
The switch board CDV, specified in microseconds. This indicates the time window in which a cell may be received on a connection and be accepted. A cell that is received on a connections outside the CDV window will be tagged or dropped as indicated by the board Policing Action.

Policing Action
The Policing Action indicates the action the switch board will take in case of a bandwidth violation.

Remote ATM
The ATM address of the entity connected to this port.

Remote IP
The IP address of the entity connected to this port.

Type
The type of the signaling path connection. UNI (User Network Interface) means that there is a workstation on the remote side. NNI (Network Network Interface) means there is another switch that communicates using SPANS on the remote side.

SPANS Status Table

This table contains the following fields:

Port
The port of this signaling path.

VPI
The VPI of this signaling path.

VCC (Virtual Channel Connections)
The number of VCCs on this signaling path.

Restarts
The number of times the switch has lost and regained contact.

Completions
The number of completed calls for this signaling path.

Failures
The number of call failures for this signaling path.

Rejections
The number of rejections for this signaling path.

Transmitted Messages
The number of transmitted messages over this signaling path.

Received Messages
The number of received messages over this signaling path.

Connectionless Transmitted
The number of connectionless transmitted messages over this signaling path.

Connectionless Received
The number of connectionless received messages over this signaling path.

SPANS Smart PVCs Source Table

This table contains the following fields:

Id
The identifier for the SPVC for which this switch is the source.

ATM Address
The ATM address of this switch source.

Destination Id
The identifier of the destination switch.

Destination
The ATM address of the destination switch.

In Port
The input port of this SPVC.

In VPI
The input VPI of this SPVC.

In VCI
The input VCI of this SPVC.

Alloc BW
The allocated bandwidth of this SPVC.

Uptime
The time since this SPVC was created, in hundredths of a second.

Status
The status of this SPVC.

Entry Status
The status of this SPVC entry.

SPANS Smart PVCs Destination Table

This table contains the following fields:

Id
The SPVC identifier at the source switch.

ATM Address
The ATM address of this switch.

Source Id
The SPVC identifier at the source switch.

Source
The ATM address of the source switch of this SPVC.

Out Port
The output port of this SPVC.

Out VPI
The output VPI of this SPVC.

Out VCI
The output VCI of this SPVC.

Alloc BW
The allocated bandwidth of this SPVC, in cells per second.

Uptime
The time since this SPVC was created, in hundredths of a second.

Status
The status of this SPVC.

Entry Status
The status of this SPVC entry.

Q2931 Admin Table

This table contains the following fields:

Port
The port for this signaling path.

VPI
The VPI of this signaling path.

VCI
The VCI of this signaling channel within this signaling path.

Admin Status
The desired state of this signaling channel.

Operational
The current operational state of this signaling channel.

SSCOP Oper Stat
The current operational state of the underlying SSCOP on this channel. SSCOP's function is to provide a reliable data link layer for the exchange of Q2931 signaling messages.

ILMI Admin Stat
The desired state of the underlying ILMI status and configuration channel.

ILMI Oper Status
The current operational state of the underlying ILMI status and configuration channel.

AAL (ATM Adaptation Layer) Type
The AAL type that is used by this Q2931 signaling path.

UNI Side
Determines the role this port takes in the UNI. If this port is connected to a host using the private UNI, it is on the network. If this port is connected to the public UNI, this port may be required to be the user.

Config Type
The configuration of the UNI at initialization. Configuring the UNI to publicUNI means that this link will be used between the switch and a public switch. Configuring the UNI to auto means that the operational type will be determined dynamically. Configuring the UNI to phaseONNI indicates that this link is used for static routing.

Oper Type
The operational configuration of the UNI. PublicUNI is used between the switch and a public switch. PrivateUNI is used between the switch and a host. PhaseONNI is used between two switches using static routing. PhaseSpansNNI is used between two switches using SPANS mapping messages for synamic routing. If the Q2931AdminConfigType is set to auto, the value of this object may be either privateUNI or phaseSpansNNI.

Remote IP
The IP address of the entity connected to this port.

Entry Stat
The status of this path entry.

Q2931 Statistics Table

This table contains the following fields:

Port
The port for this signaling path.

VPI
The VPI of this signaling path.

VCC (Virtual Channel Connections)
The VCC of this signaling path.

Restarts
The number of times this switch has lost and regained contact with the remote signaling entity on this path.

Call Completions
The number of successful call completions for this signaling path.

Call Failures
The number of call failures for this signaling path.

Call Rejections
The number of connections on this path that were rejected by the far end.

Messages Trans.
The number of transmitted messages over this signaling path.

Messages Rec.
The number of received messages on this signaling path.

SONET (Fore_SONET_App) Application

Table 5-9 lists the Icon Subviews menu selections for this application. See Chapter 1, *Introduction*, for information on accessing subviews menus.

Table 5-9. SONET Application Icon Subviews Menu

Menu Selection	Description
Configuration	Opens the Fore ATM SONET Application Configuration view described in Chapter 3, *Configuration Views*.
Model Information	Opens the Model Information view described in the ***Operator's Reference.***

ForeUserAgent (ForeUserAgent) Application

This application provides access to the Attribute Browser via the Icon Subviews menu. This browser is used to create custom views that expand access to model attributes. Refer to the ***SPECTRUM Operator's Reference*** for instructions on how to use the Attribute Browser.

ATM User (ForeUserApp) Application

Table 5-10 describes the Icon Subviews menu selections for this application. See Chapter 1, *Introduction*, for information on accessing device-specific subviews menus.

Table 5-10. ATM User Application Icon Subviews Menu Selections

Menu Selection	Description
Configuration	Opens the Configuration view described in Chapter 3, *Configuration Views*.
Connection Table	Opens the Connection Table view described below.

Connection Table

The Connection Table includes the following fields that describe the ATM User Applications connections.

Interface
The ATM interface.

Direction
The direction of the ATM connection.

VPI
The VPI for this connection.

VCI
The VCI for this connection.

Local SAP
The local SAP for this connection.

Remote SAP
The remote SAP for this connection.

Remote Address
The ATM address of the remote end of this connection.

Peak Bandwidth
The peak bandwidth for this connection, in kilobits per second.

Mean Bandwidth
The mean bandwidth for this connection, in kilobits per second.

Mean Burst
The mean burst length for this connection, in kilobits.

Uptime
The length of time since this connection was created, in hundredths of a second.

Chapter 6

ForeView

ForeView is a separately purchasable management module that provides a graphical interface to a suite of tools that help you configure, control, monitor, and troubleshoot ATM networks. ForeView provides a physical device view that uses hot spots to retrieve device information and configure device operation. Its virtual path/channel tool sets virtual paths, virtual channels, and smart PVCs. Its circuit trace tool identifies all the devices and ports used for a specific ATM circuit. The network map tool discovers and maps the location of the devices in your ATM network.

ForeView must be installed on the SpectroGRAPH workstation. Install ForeView in the ***/usr/fore/foreview*** directory path or set the environment variable **FOREVIEW_HOME** to point to the appropriate path. If this has not been done, the Foreview Not Found error message will appear. Refer to the installation instructions provided with ForeView.

What Is in This Chapter

This chapter describes the views accessible from the ForeView menu within SPECTRUM and provides illustrations of those views. The illustrations are examples and may not represent your views exactly. To access the ForeView menu, highlight the Device or ForeSwitchApp icon and from the View menu select **Icon Subviews -> ForeView**.

This chapter is organized as follows:

- Physical View
- Network Map View
- Virtual Path/Channel Tool View
- Channel/Path Tracer View

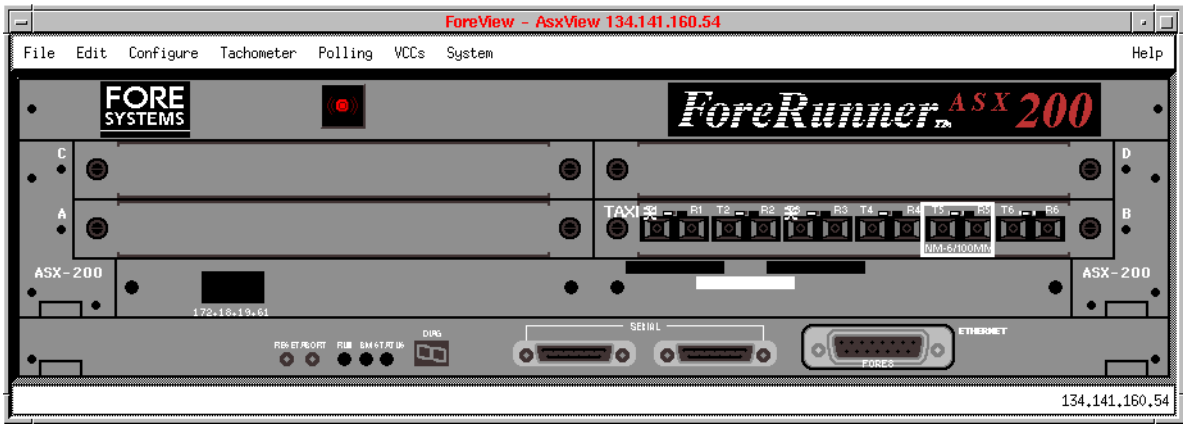
Click **HELP** in each view for information on using ForeView.

Physical View

This view provides a representation of the front panel of the device. Pull-down menus provide access to detailed information for the device. An example of the Physical view for the ASX-200 is shown in Figure 6-1.

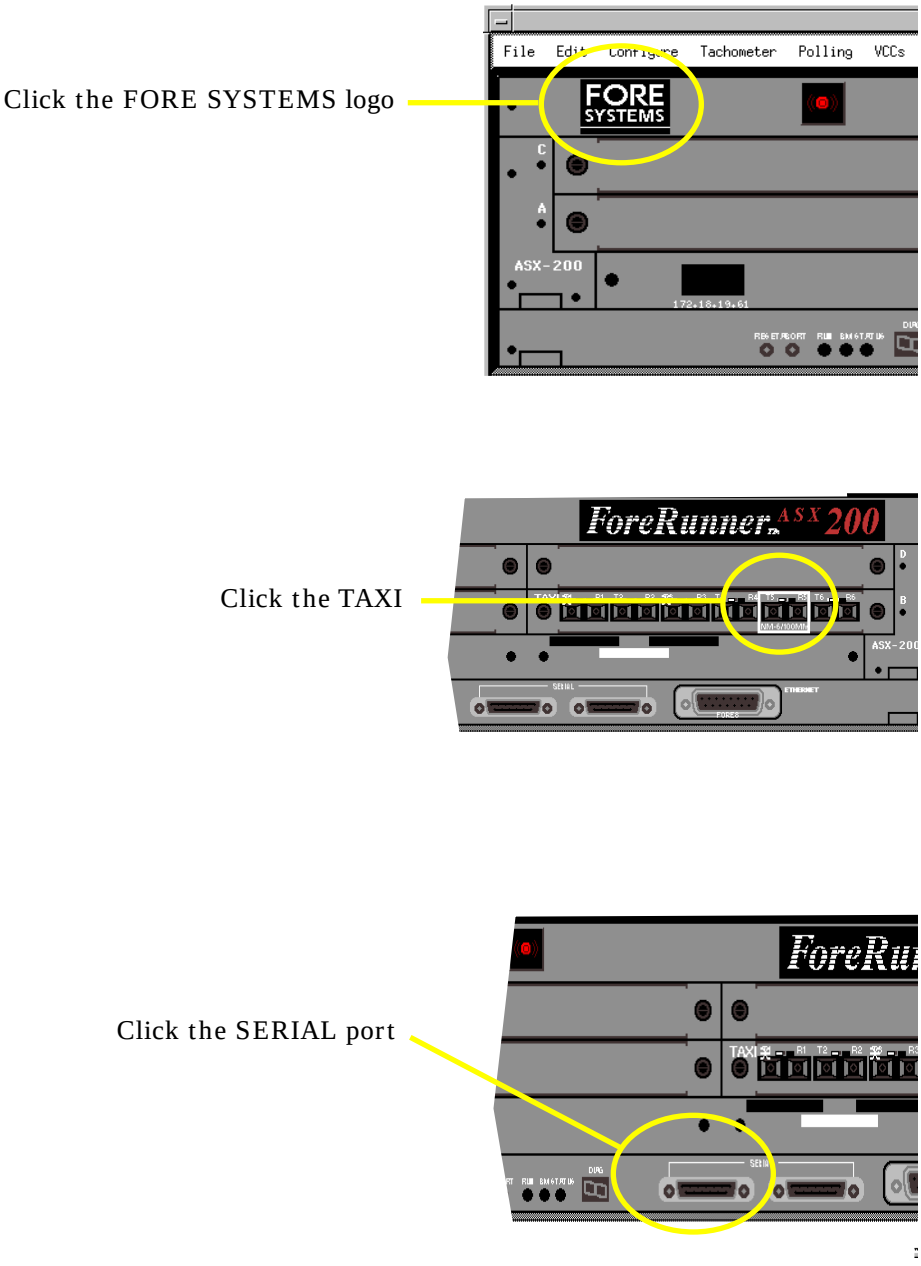
To access the Physical View, select **Physical-View** from the ForeView menu.

Figure 6-1. Physical View



The Physical view also contains “hotspots” that you click on to access information about that particular spot on the device. Examples are shown in Figure 6-2. See the ForeView documentation for information on hotspots.

Figure 6-2. Examples of Foreview Hotspots

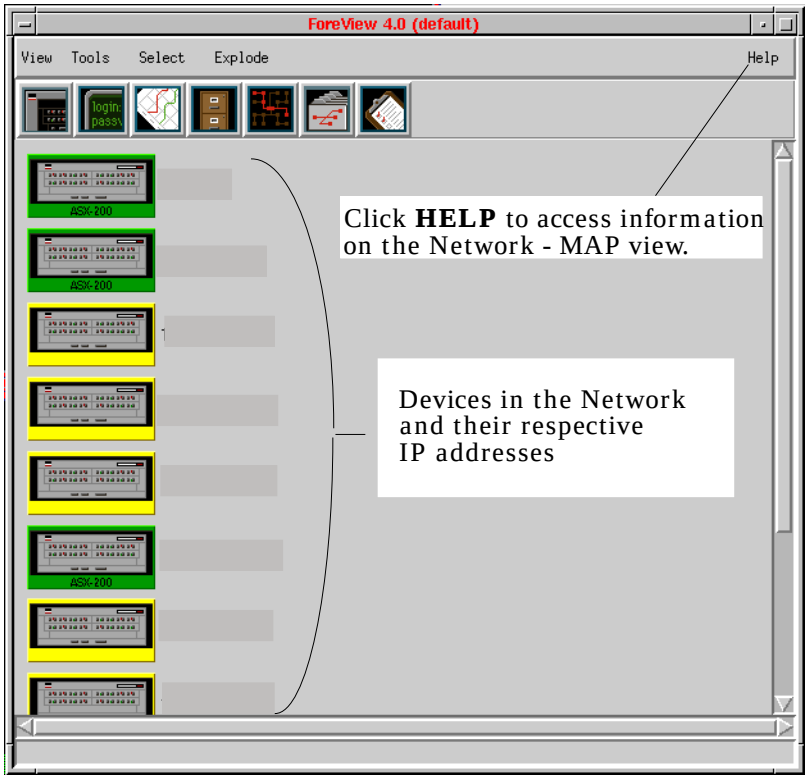


Network Map View

This view provides a map of the network that contains the highlighted device and it provides network statistics and management information. An example of the view is shown in Figure 6-3.

To access this view, select **Network - MAP** from the ForeView menu.

Figure 6-3. Network Map View

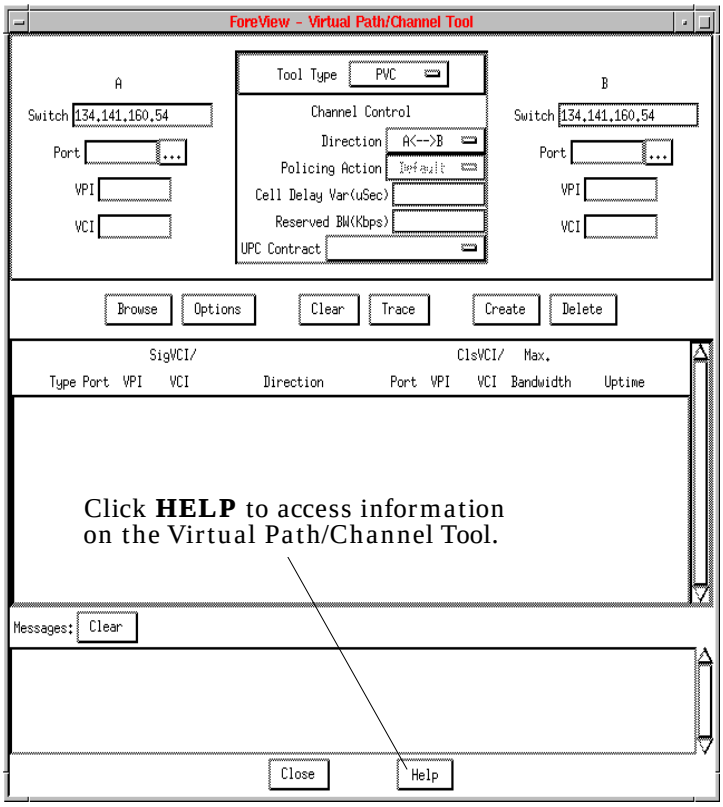


Virtual Path/Channel Tool View

This view allows you to set PVCs between two ports on different devices within the network. This allows you to set a path or channel for each port on your device. An example of the view is shown in Figure 6-4.

To access the Virtual Path/Channel Tool view, select **Virtual-Path**, **Virtual Channel**, or **SmartPVCs** from the ForeView menu.

Figure 6-4. Virtual Path/Channel Tool

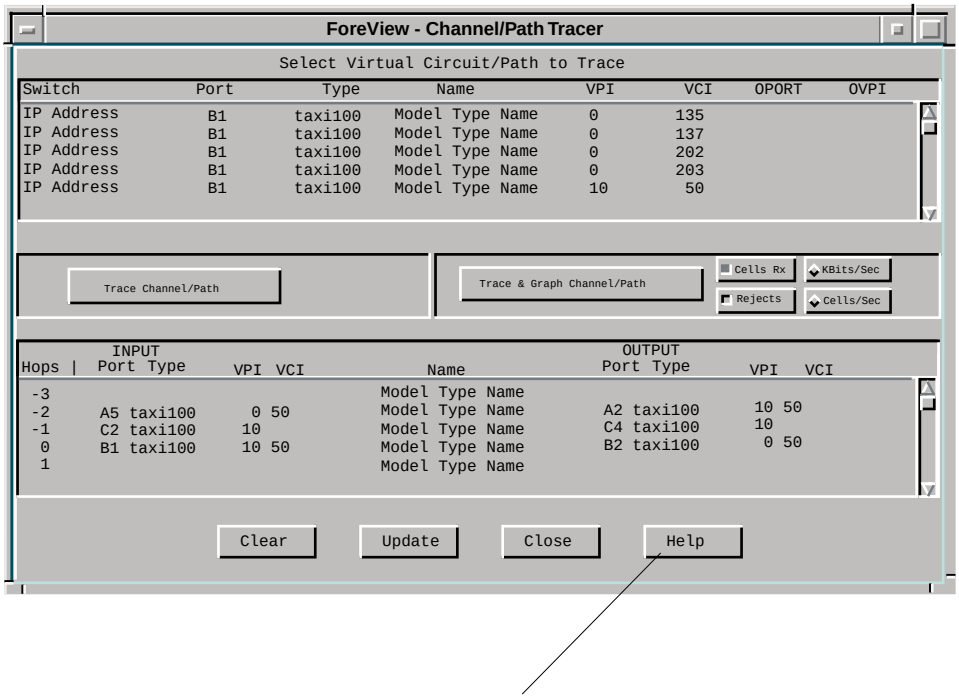


Channel/Path Tracer View

This view allows you to trace the path between two ports on different devices within the network. This allows you to locate the path or channel for each port on your device. An example of the view is shown in Figure 6-5.

To access the view, select **Circuit-Trace** from the ForeView menu.

Figure 6-5. Channel/Path Tracer View


ForeView - Channel/Path Tracer
Select Virtual Circuit/Path to Trace
Switch Port Type Name VPI VCI OPORT OVPI
IP Address B1 taxi100 Model Type Name 0 135
IP Address B1 taxi100 Model Type Name 0 137
IP Address B1 taxi100 Model Type Name 0 202
IP Address B1 taxi100 Model Type Name 0 203
IP Address B1 taxi100 Model Type Name 10 50
Trace Channel/Path
Trace & Graph Channel/Path
Cells Rx
KBits/Sec
Rejects
Cells/Sec
INPUT
Hops | Port Type VPI VCI
Name
OUTPUT
Port Type VPI VCI
-3 Model Type Name
-2 A5 taxi100 0 50 Model Type Name A2 taxi100 10 50
-1 C2 taxi100 10 Model Type Name C4 taxi100 10
0 B1 taxi100 10 50 Model Type Name B2 taxi100 0 50
1 Model Type Name
Clear
Update
Close
Help

Click **HELP** to access information on the Channel/Path Tracer view.

Appendix A

Overview of Signaling Concepts

This appendix provides an overview of the concepts for setting up signaling. The specific type of signaling you establish depends on what equipment you have installed and the network communications you are using. Some of the types of signaling that can be set up are as follows:

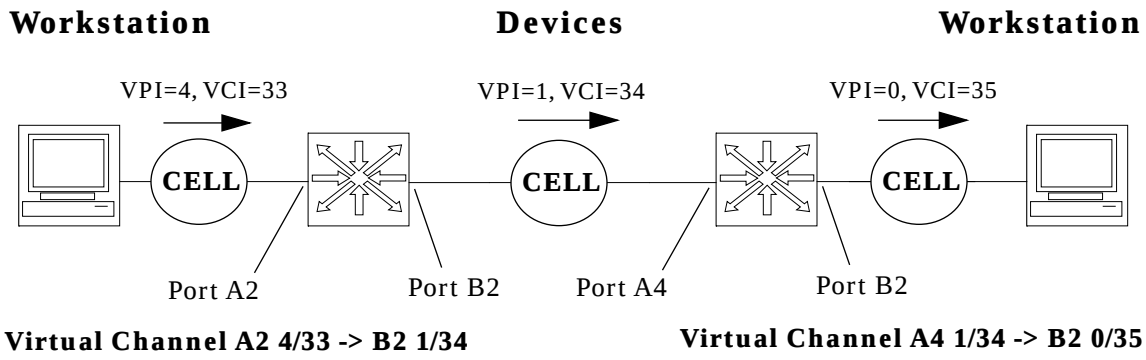
- Classical IP
- Classical IP with the workstation as the ARPSERVER
- Classical IP with the switch as the ARPSERVER
- Network Service Access Point (NSAP) in the Device
- Permanent Virtual Circuit (PVC)
- User Network Interface (UNI) Signaling
- LAN Emulation with API
- LAN Emulation with ForeView
- IISP
- SPANS

Refer to the FORE Systems, Inc., documentation delivered with your ForeRunner devices for specific procedures on setting up signaling.

You set up signaling for each workstation in your network to establish mappings that route ATM cells from a source to a destination. The routes are referred to as virtual channels and virtual paths. You can set the virtual channels and paths to create a Permanent Virtual Circuit (PVC) for dedicated long-term information transfer between two endpoints.

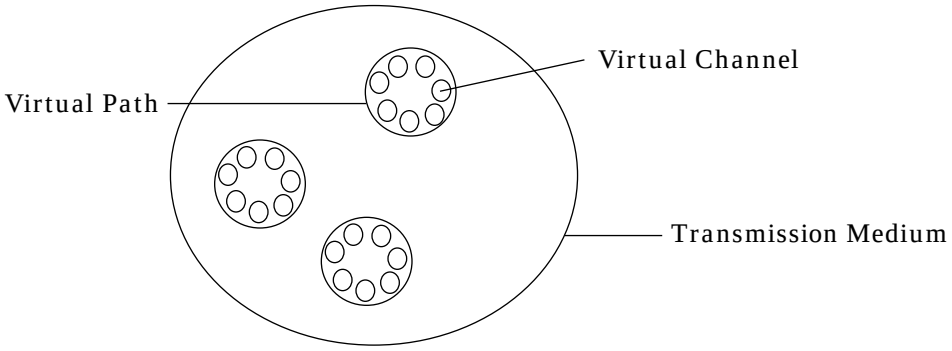
An ATM cell includes a five-byte header that contains a Virtual Path Identifier (VPI) and a Virtual Channel Identifier (VCI). These identifiers are used by the receiving device to determine the correct output port for the cell. The VPI and VCI may be set to a different value at the output to be received by the next device in the network (Figure A-1).

Figure A-1. Virtual Channels



Virtual paths establish connections between devices within your network. They are used to route ATM cells through virtual channels. Each virtual path routes hundreds of virtual channels and there are hundreds of virtual paths within the transmission medium (Figure A-2). Virtual channels travel inside virtual paths; therefore, both are required to create a virtual connection.

Figure A-2. Virtual Path and Virtual Channel Relationship



Through-paths are set to route the virtual path, including all virtual channels, through a device. The VPI is used to determine the output port. The VCIs for each channel do not change. Through-paths, like virtual paths and channels, are unidirectional. A through-path must be set in each device in both directions to become bidirectional.

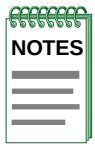
Appendix B

Discovering Your ATM Network

What Is in This Appendix

This appendix describes how to discover and model a network that includes ATM switches, which involves the following steps:

1. Create a “seed switch” representing one of your ATM switches.
2. Run SPECTRUM AutoDiscovery to discover and model your network, including ATM switches.
3. Run ATM Discovery from the command line to complete the ATM switch discovery.



1. This appendix describes how to create a seed switch and run SPECTRUM AutoDiscovery. Refer to **ATM Switch Discovery Process** (Cabletron part number 9032521) for instructions on running ATM Discovery.
2. It is recommended that you create device and network models automatically using SPECTRUM’s AutoDiscovery feature to ensure proper modeling of your network. (See **AutoDiscovery User’s Guide** for detailed instructions on modeling your network.) If you choose to model your network manually, refer to Appendix C, *Manual Modeling*.
3. Whether you discover your network manually or use SPECTRUM AutoDiscovery, you must begin by modeling an ATM device “seed switch” within the network. SPECTRUM uses the seed switch model as a starting point to identify the other devices within the network.
4. You should check the firmware version of each switch in your network prior to running SPECTRUM AutoDiscovery. SPECTRUM management of your ATM network is most reliable for switches with the latest firmware version.

Checking the Firmware Version

The procedure you use to check the firmware version depends on whether you are checking a 9A000, SFCS, or ASX type device. Two methods are described below. An example of the information that appears when you complete the procedure is shown in Figure B-1.

Checking Firmware of 9A000 and SFCS Devices

Check the firmware version for each switch as follows:

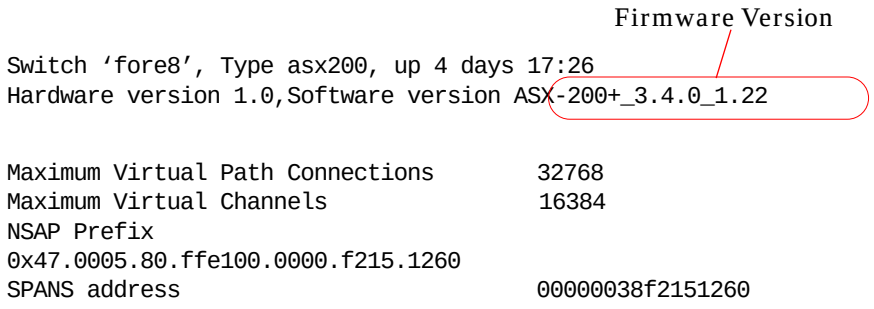
1. From your console, telnet to the ForeRunner module.
2. Enter the password: ASX
3. At the prompt type: `operation version`

Checking Firmware of ASX Devices

Check the firmware version for each switch as follows:

1. From your console, telnet to the ForeRunner module.
2. Enter the password: ASX
3. At the prompt type: `config switch`
4. At the next prompt type: `show`

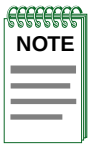
Figure B-1. Firmware Version



Modeling a Seed Switch

Follow these steps to create a device model to be used as a seed switch.

1. At the Universe level, select **File -> Edit** to enter the Edit mode.
2. Select **Edit -> New Model**. The Select Model Type dialog box displays.
3. Select **ForeRunner** from the Select Model Type dialog box and click **OK**. The Creation dialog box displays.
4. Fill in the Creation dialog box parameters as described below.
   a. **Model Name** - Assign a unique name that identifies this switch.



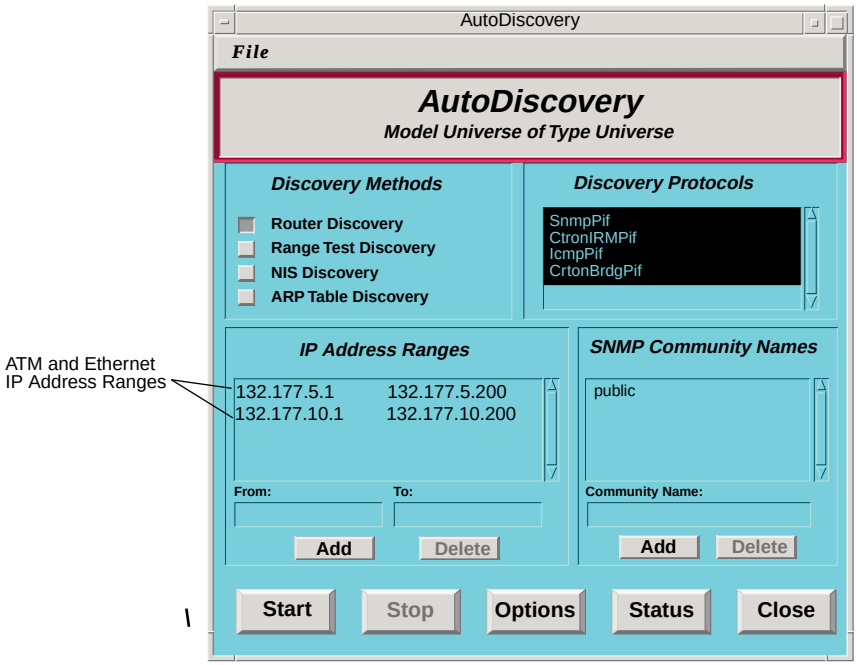
For SPECTRUM to correctly discover and model an ATM network, the ForeRunner device must have two IP addresses: one for the Ethernet side of the switch and one for the ATM side. Either IP address can be used for the purpose of manually modeling the seed switch. See Appendix C, *Manual Modeling*, for instructions.

   b. **Network Address** - Enter the Internet Protocol (IP) address that has been assigned to the switch. The IP address may represent a LAN address or an ATM network address.
   c. **Security String** - Assign the Security String of the device. Refer to the ***Administrator's Reference*** for details on setting up security in SPECTRUM.
   d. **Polling Interval** - Enter the time interval, in seconds, for polling any attributes that have been flagged as "POLLED." The default value is 60 seconds.
   e. **Log Ratio** - Enter the number of poll cycles that must be achieved before the SpectroSERVER writes any attributes that have been flagged as "LOGGED" to the statistical database. The default value is 10.
5. After filling in the above parameters, click **OK**. An icon representing the switch appears at the top of the window.
6. The icon can be moved to another area of the window by dragging it using the left mouse button while still in the Edit mode.

Running AutoDiscovery

Using Figure B-2 and the instructions in the ***AutoDiscovery User's Guide***, discover the devices within the IP address ranges for both the Ethernet address and ATM address for each device.

Figure B-2. AutoDiscovery Dialog Box



Appendix C

Manual Modeling

What Is in This Appendix

This appendix describes the procedures for modeling single and multiple devices and workstations. Modeling these devices involves creating a switch model at the Universe level, creating ATM and LAN or discrete LAN conceptual network models, and configuring application and link models within the conceptual network models.

This appendix includes the following topics:

- *Read Me First*
- *Modeling a Single Device and Workstation* on Page C-2
- *Modeling Multiple Devices and Workstations* on Page C-10

Read Me First

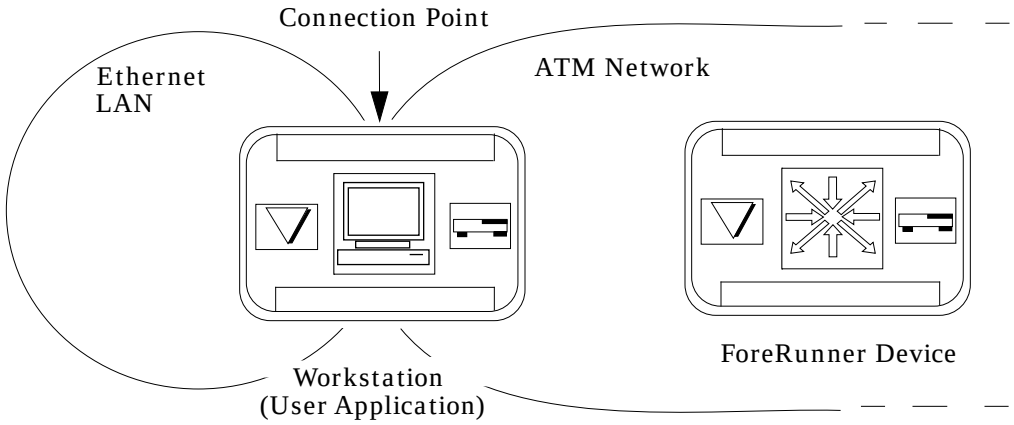
It is recommended that you model your network automatically using SPECTRUM's AutoDiscovery feature to ensure the best modeling of your network. (See the ***AutoDiscovery User's Guide*** for details on modeling your network.) Before modeling your network, you must model an ATM device "seed switch" within the network. SPECTRUM uses the seed switch as a starting point to identify the other devices within the ATM network. Refer to Appendix B, *Discovering Your ATM Network*, for information on creating a seed switch. Once you have discovered and modeled your network devices manually or using SPECTRUM AutoDiscovery, you must run ATM Discovery. Refer to ***ATM Switch Discovery Process*** for instructions on running ATM Discovery from the command line.

If you choose to model your network manually, use the procedures described in this appendix.

Modeling a Single Device and Workstation

This section describes the procedure for modeling a single device and its related applications and conceptual models. Figure C-1 provides a conceptual overview of modeling a single device and workstation (user application).

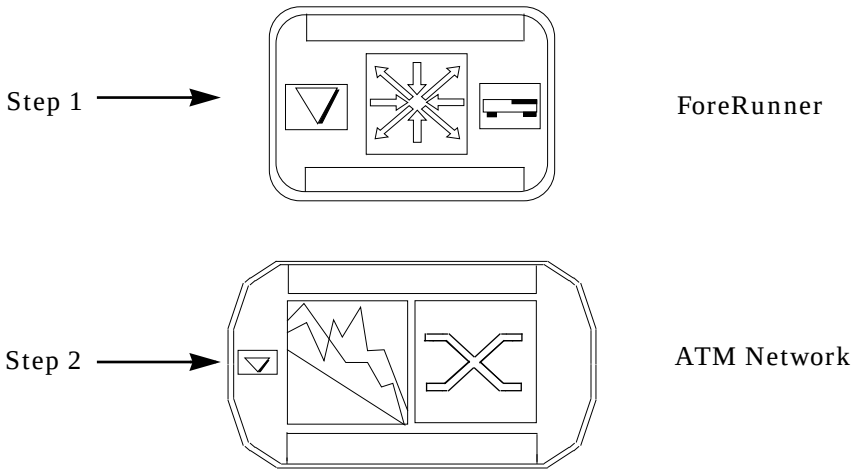
Figure C-1. Modeling a Single Device and Workstation Conceptual Overview



In the following procedure, the step numbers in the text correspond to the step numbers in the illustrations.

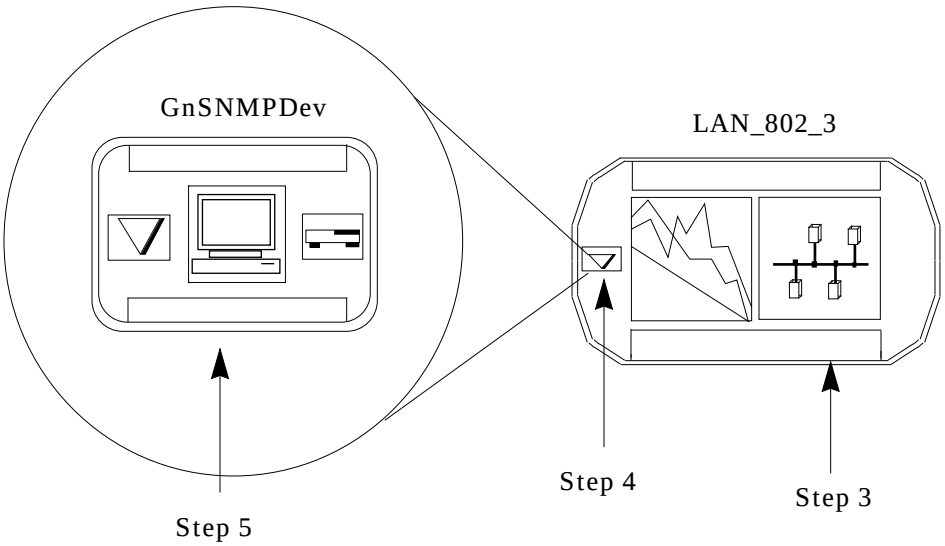
1. Create a ForeRunner switch model at the Universe level (Figure C-2).
2. Create an ATM_Network model at the Universe level.

Figure C-2. Creating the Universe Level Models



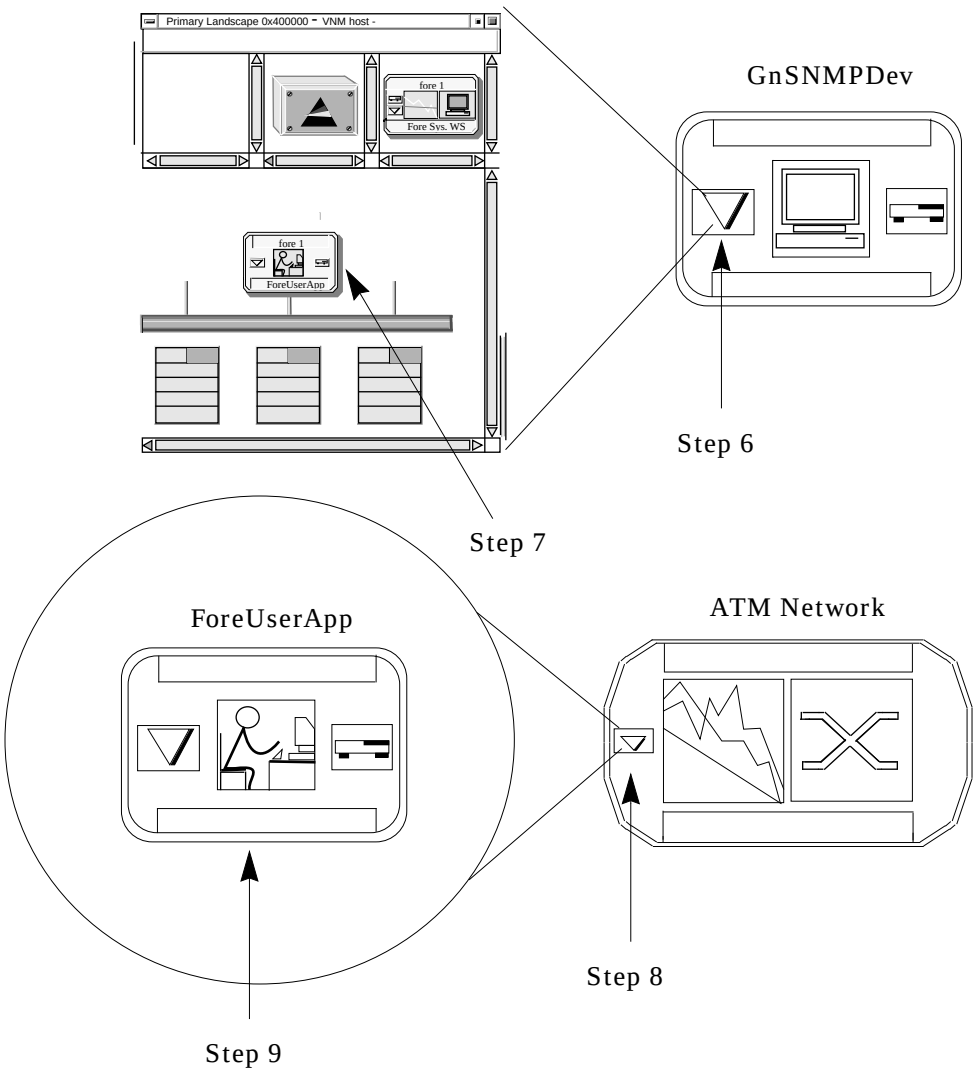
3. Create the LAN or discrete LAN model at the Universe level (Figure C-3).
4. Go into the LAN or discrete LAN model.
5. Create a Workstation model with GnSNMPDev representing the ATM endpoint.

Figure C-3. Creating the Workstation Model



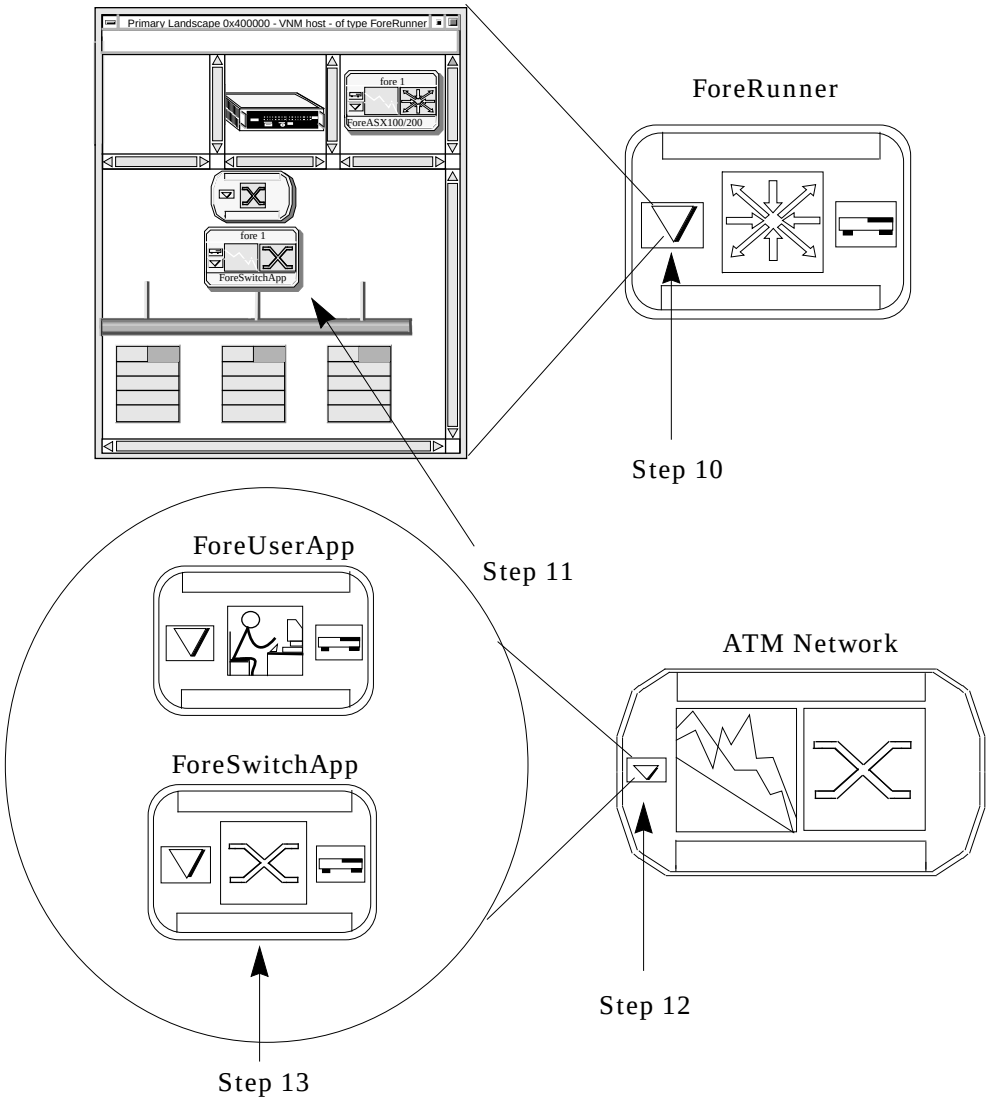
6. Go into the Workstation (GnSNMPDev) model's Topology view (Figure C-4).
7. Highlight and Edit/Copy the ForeUserApp model.
8. Go into the ATM_Network model.
9. Paste the ForeUserApp model into the ATM_Network model.

Figure C-4. Pasting the ForeUserApp Model into the ATM_Network Model



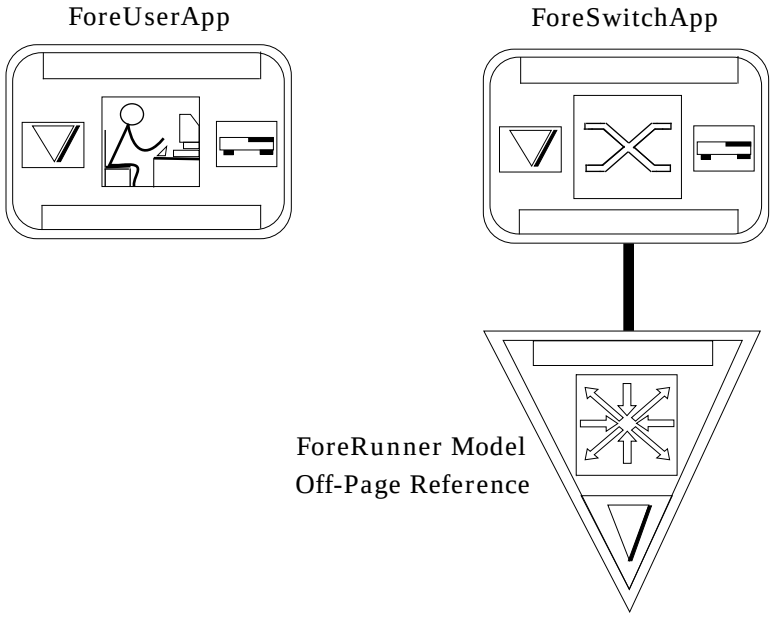
10. Go into the ForeRunner model's Topology view (Figure C-5).
11. Highlight and Edit/Copy the ForeSwitchApp model.
12. Go into the ATM_Network model.
13. Paste the ForeSwitchApp model into the ATM_Network model.

Figure C-5. Pasting the ForeSwitchApp Model into the ATM_Network Model



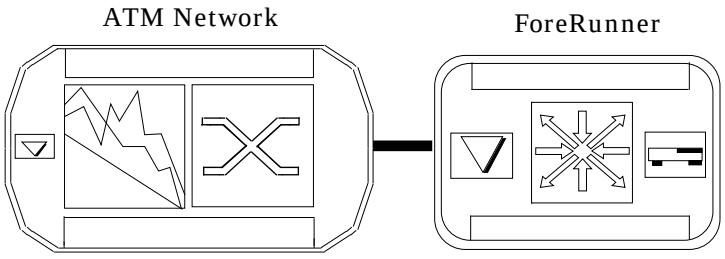
An Off-Page Reference icon representing the ForeRunner model will be connected to the ForeSwitchApp model in the ATM_Network model (Figure C-6).

Figure C-6. The ForeRunner Off-Page Reference



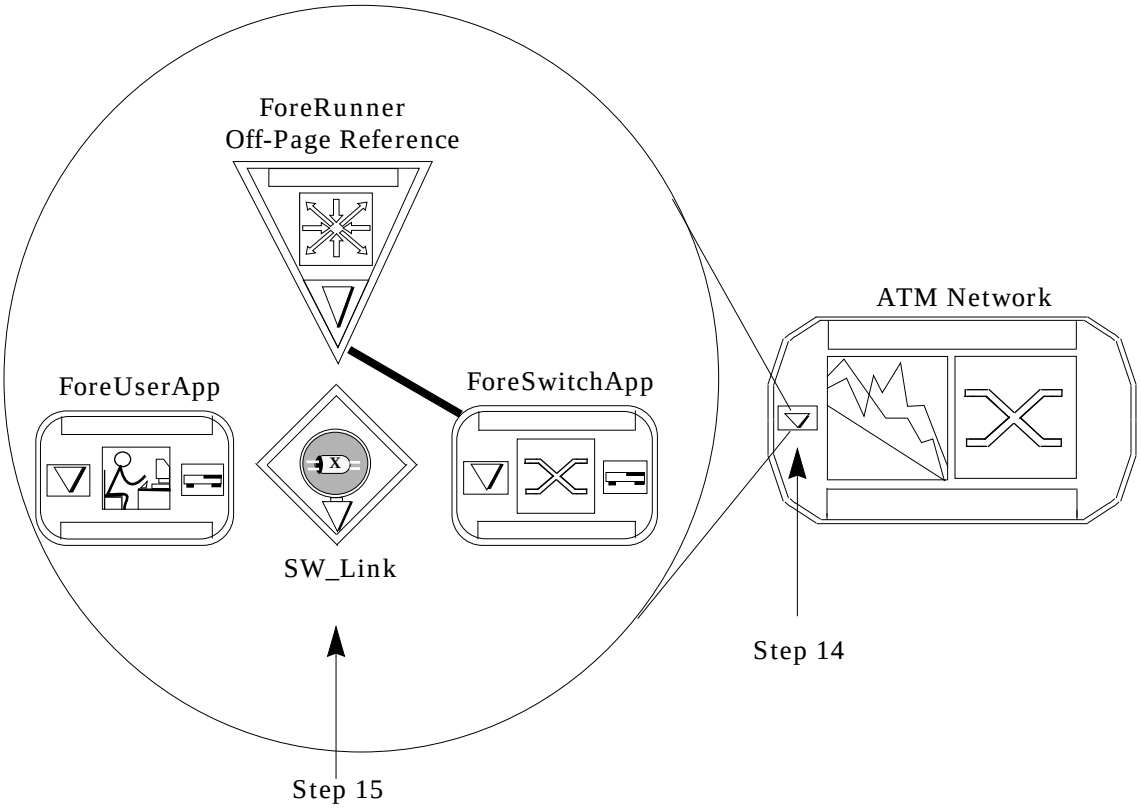
At the Universe level, a logical pipe connection will automatically be drawn between the ForeRunner model and the ATM_Network model (Figure C-7).

Figure C-7. Automatically Placed Universe Level Logical Pipe Connection



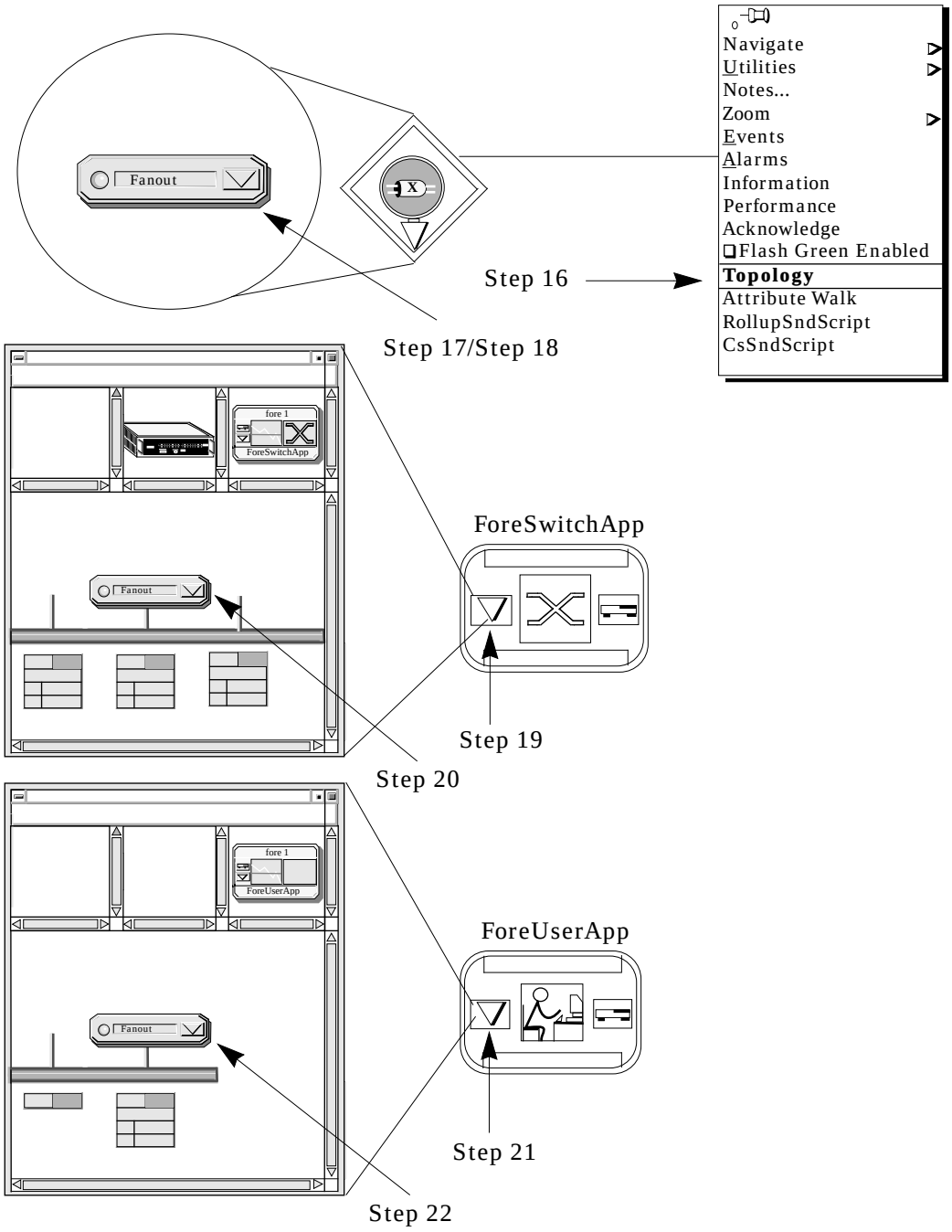
14. Go into the ATM_Network model (Figure C-8).
15. Create an SW_Link model.

Figure C-8. Creating the SW_Link Model



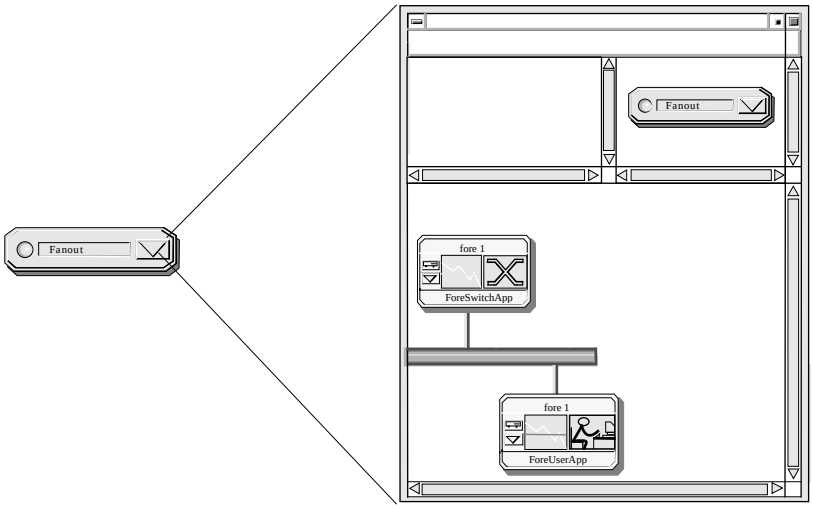
16. Go into the SW_Link model by highlighting the icon and selecting **View -> Icon Subviews -> Topology** (Figure C-9).
17. Create a Fanout model.
18. Highlight and Edit/Copy the Fanout model.
19. Go into the ForeSwitchApp model's Topology view.
20. Paste the Fanout model into the ForeSwitchApp model's Topology view and resolve it to the proper port. The Fanout will now be green in the SW_Link model.
21. Go into the ForeUserApp model's Topology view.
22. Paste the Fanout model into the ForeUserApp model's Topology view and resolve it to the proper port.

Figure C-9. Creating, Pasting, and Resolving the Fanout Model



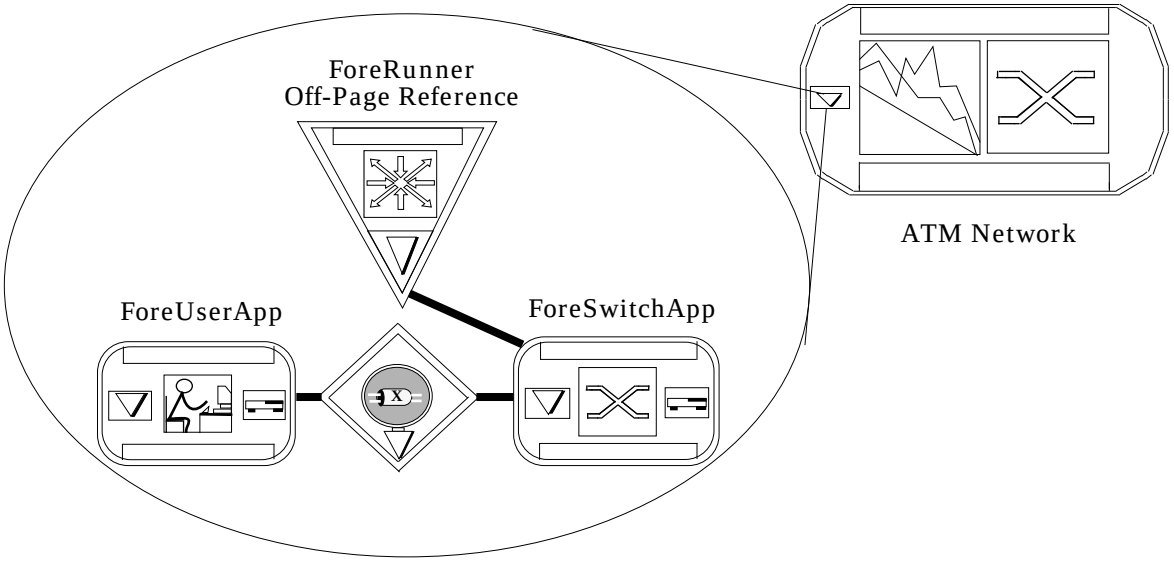
The ForeSwitchApp and ForeUserApp models will now appear in the Fanout model's Cablewalk View (Figure C-10).

Figure C-10. The Fanout Cablewalk View



In the ATM_Network model, there will now be logical pipe connections between the SW_Link model and the ForeSwitchApp and ForeUserApp models (Figure C-11).

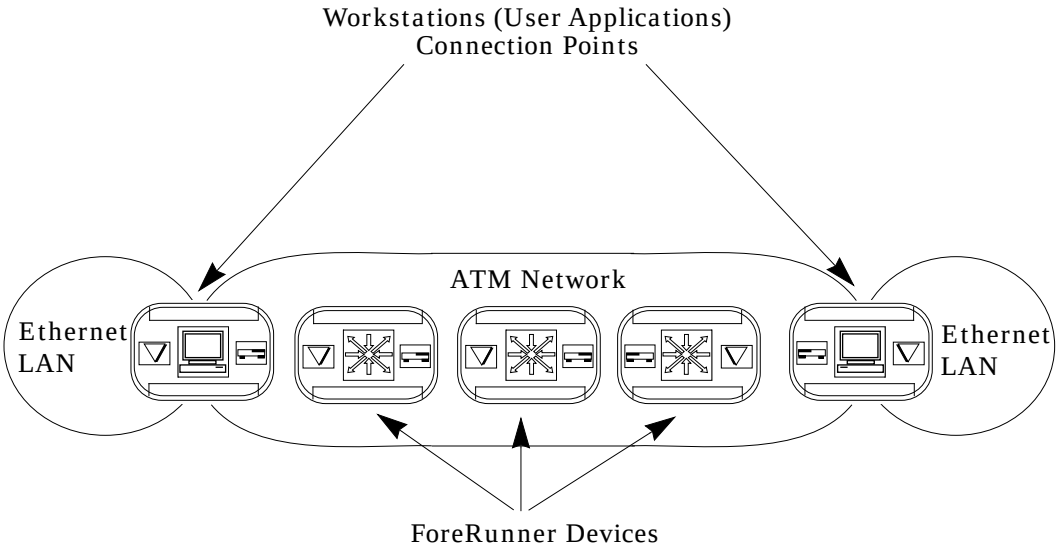
Figure C-11. Logical Pipe Connections in the ATM_Network Model



Modeling Multiple Devices and Workstations

This section describes the procedure for modeling multiple ForeRunner devices and related applications and conceptual models. Figure C-12 provides a conceptual overview of modeling multiple devices and workstations (user applications).

Figure C-12. Modeling Multiple Devices and Workstations Conceptual Overview



The process of modeling multiple ForeRunner devices is similar to the one for modeling single devices and involves the following procedures previously described:

1. Create the Universe level switch models.
2. Create additional GnSNMPDev workstation models.
3. Copy the ForeUserApp model from the workstation's Topology view and past it into the ATM Network model.
4. Copy the ForeSwitchApp model from each additional switch's Topology view and past it into the ATM Network model.
5. Create additional SW_Link models between the new switch and workstation models.
6. Create a Fanout model inside each additional SW_Link model.

7. Copy, past, and resolve the Fanout model in the Topology view of each ForeUserApp or ForeSwitchApp model adjacent to the SW_Link model.

In the ATM_Network model, additional logical pipe connections will automatically be drawn between the SW_Link models and their adjacent ForeUserApp or ForeSwitchApp models.

In the Universe level, additional logical pipe connections will automatically be drawn between the new ForeRunner models and the ATM_Network model.

Figure C-13 and Figure C-14 depict the end results of this modeling process.

Figure C-13. Completed ATM_Network Model

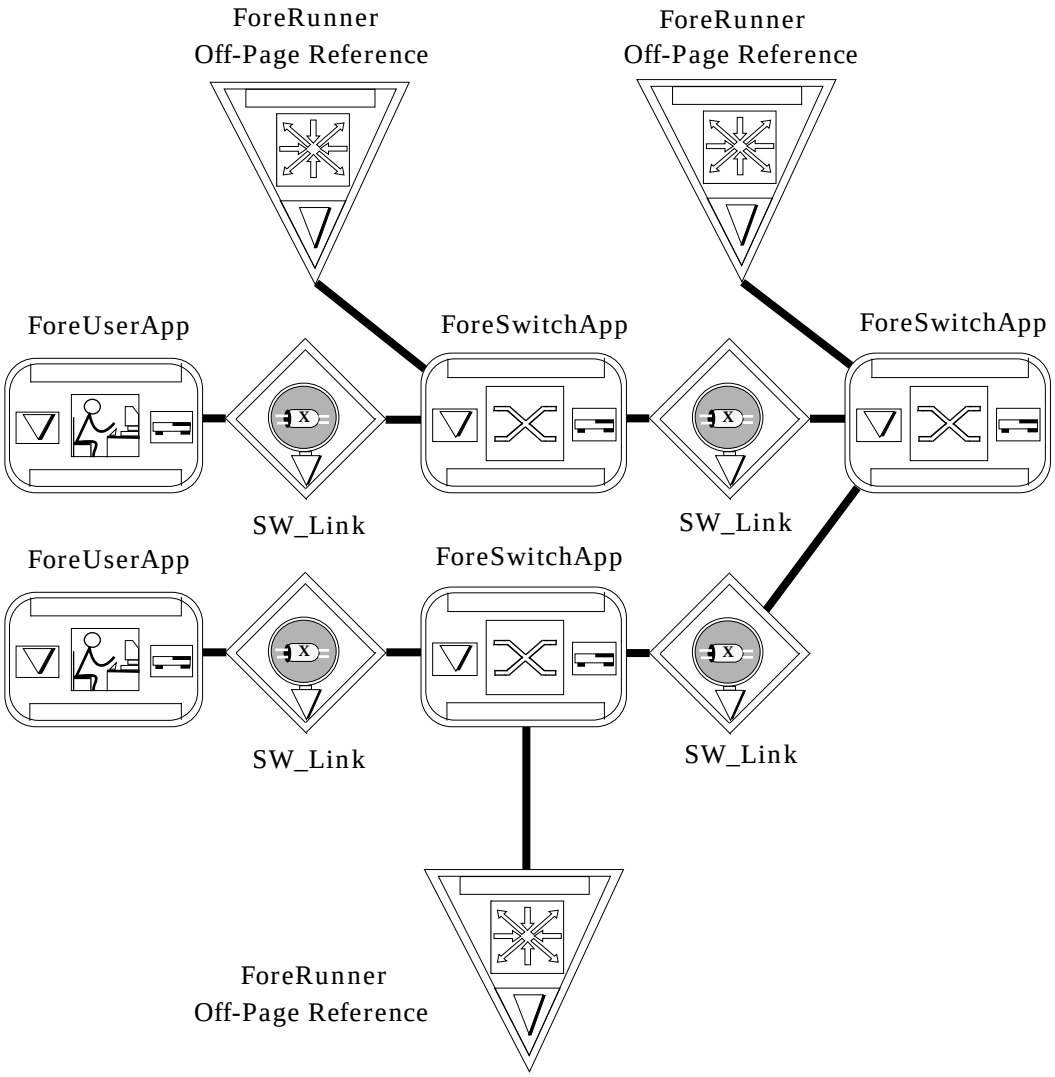
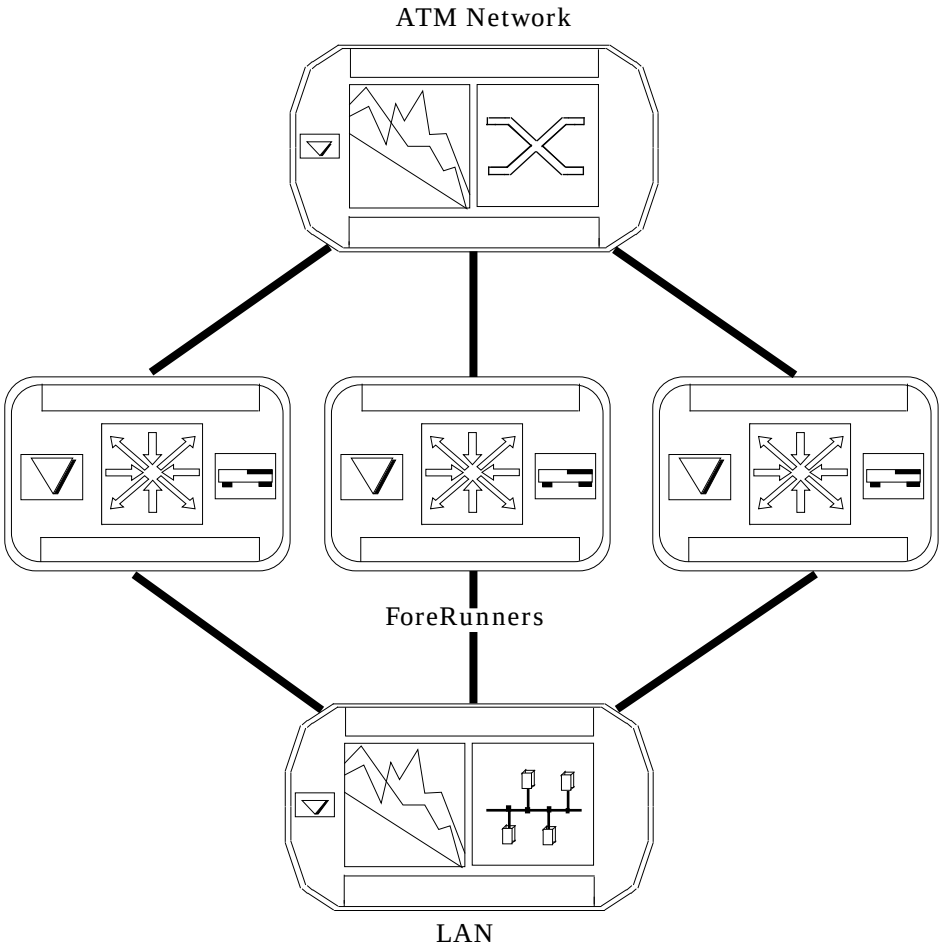


Figure C-14. Automatically Placed Universe Level Logical Pipe Connections



Index

Numerics

9A000 1-2

A

AAL0 2-27
AAL4 2-27
AAL5 2-27
Accessing SPECTRUM Views 1-9
Adaptor Type 3-9
Address 5-7, 5-18
  MAC 2-4
  Physical 2-7
Address Label 2-4
Administrative Status 2-7, 2-16, 2-24, 3-8
Age 5-17, 5-18
Alarm Discard Threshold 2-8
Alarm Messages 4-1
Alt Metric 2 5-8
Application View 5-1
  Icon Mode 5-3
  List Mode 5-4
ASX Switches 1-2
Asynchronous Transfer Mode 1-2
ATM
  Address 3-7, 3-9, 5-17
  Cells 1-2
  Interface Type 2-24
  User Configuration View 3-7
ATM_Network Model Type 1-5
Attribute Selected 2-11, 2-20
AutoDiscovery B-4, C-1

B

Bandwidth
  Allocated 5-13, 5-14, 5-15
  In/Out Allocated 3-8
  In/Out Maximum 3-8
  In/Out Used 3-8
  Interface 2-7
  Maximum 5-13, 5-14
  Used 5-13, 5-15
Board 3-6, 3-10
Broadcast Address 5-9
Buffer Size 3-6
Buffer Table View 3-3

C

Cablewalk View C-9
Capacity 5-17, 5-18, 5-19
Carrier 3-6
CDV 5-17
Cell Header A-1
Cells 1-2, 5-13, 5-14, 5-15
Channel Allocation 5-13
Channels
  Allocation 5-12
  Maximum 5-12, 5-13
Connection Table 5-27
Creates 5-9

D

Delivered 5-6
Destination 5-17, 5-18, 5-19
  Address 5-8
  Mask 5-19
  Port 5-19
Detail View 2-9
Discards 5-6
Discovering Your Network B-1
Double-Click Zones 1-8

E

Error Rate Threshold 2-8
Errors 3-6, 5-6
Event Messages 4-1

F

Fails 5-9, 5-10

Firmware Version 3-7, 3-9, B-2
Fore ATM SONET Configuration View 3-10
Fore User Application Table View 5-26
ForeRunner
  Configuration View 3-2
  Model Types 1-4
  Physical View 6-2
ForeSwitchApp 3-8
ForeUserApp 3-9
ForeUserApp Model Type 1-6
ForeView 6-1
ForeView Installation 6-1
Forward 5-6
Fragmentation 5-7
Frames
  Delivered 5-5
  Forwarded 5-5
  Transmitted 5-5
Framing Default 3-10
Framing Operation 3-10

G

Gauge
  Mode 2-12, 2-20
  Selected Attribute 2-12, 2-20
  Type 2-12, 2-20
Gauge Control Panel
  ForeRunner 2-10
  ForeSwitchApp 2-19
  ForeUserApp 2-28
Gauge Label 2-16, 2-24, 2-25

H

Hardware Speed 3-7, 3-9
Hardware Version 3-7, 3-9
Header 5-7

I

ICMP_App 5-2
Icon Modification 2-10, 2-19, 2-28
Icon Types 1-4
In, Discards 5-7
In, Port 5-14, 5-16
In, VCI (Virtual Channel Identifier) 5-16
In, VPI (Virtual Path Identifier) 5-14, 5-16
Index 5-17, 5-18
Interface 5-8, 5-9
  Description 2-7, 2-10, 2-19, 2-28
  Detail View 2-9
  Icon, Device View 2-3, 2-15
  Index 2-7
  Label 2-4, 2-16, 2-24
  Status of 2-4
  Type 2-4
Interface Icon, Device View
  Administrative Status 2-4, 2-16, 2-24
  Gauge Label 2-16, 2-24, 2-25
  Illustration 2-3, 2-15, 2-23
  Interface Number label 2-4, 2-16, 2-24
  Interface Type Label 2-4
  Network Information Label 2-24
Interface Options Panel 2-12, 2-20
  ForeRunner 2-10
  ForeSwitchApp 2-19
  ForeUserApp 2-28
Interface Type 2-16
Inter-Switch Links 5-18
IP Address 5-9
IP Forwarding 5-8
IP Reassembly 5-10
IP Routing
  Address Table 5-9
  Application 5-6
  Configuration 5-7
  Fragmentation 5-9
  Packets 5-7
  Reassembly 5-10
  Statistics 5-6
  Table 5-8

L

Label and Double-Click Zones 2-3, 2-15, 2-23
Lin Button 2-9, 2-18
Line Coding 3-10
Line Status 3-11
Line Type 3-10
Link QoS 5-20
Load Alarm Threshold 2-8
Log Button 2-9, 2-18
Logical Pipe Connection C-6
Loopback 3-11

M

MAC Address Label 2-4
Mask 5-18
Max Channels 5-17
Max Paths 5-17
MIB-II 5-2
Model 3-6
Modeling a Device 1-3, B-1, C-1
Module 3-6, 3-10
Module Table View 3-4

N

Network
  Information 2-24
  Management 6-4
  Mask Address 5-9
Network Statistics 6-4
Next Hop Address 5-8
Notice i
Number of Links 5-17
Number of Ports 3-5

O

OKs 5-9, 5-10
Operational Status 2-7, 3-6, 3-7, 3-8, 3-9
Out, Discards 5-7
Out, Port 5-14, 5-16
Out, VCI (Virtual Channel Identifier) 5-16
Out, VPI (Virtual Path Identifier) 5-14, 5-16
Overflows 3-6

P

Packet Size 2-7
Packet Threshold 2-8
Path
  Status 3-11
  Table Views 5-12
  Tracing 6-6
  Width 3-10
Paths-In/Out Max 3-8
Paths-In/Out Number 3-8
Performance Statistics 2-5, 2-16, 2-24, 2-25
Physical Layer 3-7, 3-9
Policing Act 5-17
Port 3-6, 3-10, 5-12, 5-13, 5-15, 5-19
Port Configuration
  ForeSwitchApp 3-8
  ForeUserApp 3-9
Port Detail View 2-18
Port Number 3-7, 3-8, 3-9
Port Uptime 3-8
Ports Routed 5-15
Primary Metric 5-8
Protocol 5-13, 5-14, 5-15, 5-16
Provides Relation 5-5
PVCs, Setting 6-5

Q

Queue Length 3-6

R

Reassembles Timeout 5-7
Reassembly 5-7
Rec Carrier 3-7, 3-9
Related Reading xiii
Remote ATM Address 3-8
Remote IP Address 3-8
Requests 5-10
Restricted Rights Notice ii
Route, Age 5-8
Routing Type 5-8
Rx Scrambling 3-11

S

Secondary Address Panel 2-8
Section Statistics 3-11
Seed Switch B-3
Serial Number 3-7, 3-9
Signaling A-1
Signaling Table Views
  Q2931 Admin 5-20
  Q2931 Statistics 5-20
Smart PVCs 6-5
SNMP2_Agent 5-2
Software Version 3-7, 3-9
Source 5-17, 5-18, 5-19
Source Mask 5-19
Source Port 5-19
SPANS 5-20
SPECTRUM Support 1-7
State 5-19

Statistical Information 2-3, 2-15, 2-23
Status 5-13, 5-14, 5-15, 5-16, 5-19
SW_Link Model Type 1-6
Switch Application Configuration View 3-5
System2_App 5-2

T

TCP2_App 5-2
Time To Live 5-7
Tracing a Path 6-6
Trademarks i
Transmitted 5-6
Tx Clock Source 3-11
Tx Scrambling 3-11

U

UDP2_App 5-2
Unknown IP Routing Packets 5-7
Uptime 3-9, 5-13, 5-14, 5-15, 5-17

V

VCI (Virtual Channel Identifier) 5-15
VCI, Cell Header 1-2, A-1
VCs 5-13
Version 3-6
Virtual Channel 6-5
Virtual Channel Identifier 5-15
Virtual Path 6-5
Virtual Path Identifier (VPI) 5-12, 5-13, 5-15
Virus Disclaimer ii
VPI (Virtual Path Identifier) 5-19
VPI, Cell Header 1-2, A-1

W

Workstation Model Type 1-7

Z

Zones, Double-Click 1-8, 2-3, 2-15, 2-23